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Greetings from Dr. Gunther Voswinckel President International Tube Association

Dear Members, dear Readers,

The outlook is cautious but positive: The recovery of the global demand for steel is said to be 'solid'. The figures show that global production of crude steel was up by 4.1 % in the first three months of 2018, compared to the same period in 2017.

Global growth in steel demand overall is expected to be more moderate, but nearly all geographic regions can expect to experience some growth in 2018, say the forecasters.

In the EU, the outlook for 2018 and 2019 is positive, although, says Eurofer (the European Steel Association) in its Outlook 2018-2019, "activity in steel-using sectors will settle back into a more restrained pace of expansion owing to waning momentum in the tube sector and automotive industry."

Numbers indicated that a healthy rise in total EU tube output in 2017 resulted in the best annual production volume in the EU since 2012. Steel tube production in the EU is forecast to decline somewhat in 2018 – in line with a downturn in pipeline construction projects – but a slight increase in production activity is expected in 2019.

Meanwhile, innovation continues to drive change within the industry and the innovative strength of manufacturers is what enables it to adapt to the constantly shifting fortunes of the industries it

supplies. So, for example, as the oil and gas industries falter, the need for more efficient designs and lighter materials within the automotive industry presents growth opportunities.

The output of research and development teams needs a platform – which is why our trade fairs and expos are of vital importance beyond their value as a marketing forum for individual companies. They let us share and promote the results that will allow us to move forward as an industry. They foster exchange that leads to new ideas and even better innovative initiatives.

As the Messe Düsseldorf press team reported following the most recent Tube fair in Düsseldorf, steel and metal processing are "among the ten major sectors of industry" in Germany and German companies are benefitting from a positive global business climate.

The Tube 2018 organisers reported this year's fair was "bigger than ever". They said visitors from 134 different countries demonstrated great professional expertise, "while promising customer contacts and good post-fair business prospects determined the atmosphere at the stands. Over 50% of visitors [...] came with concrete investment intentions."

The International Tube Association, as the Tube fair's main industry partner, is always represented as you know, and meets



*Dr. Gunther Voswinckel
President ITA*

many of you on the ground at similar events all over the world. We're here to keep our members updated and inform you of future events.

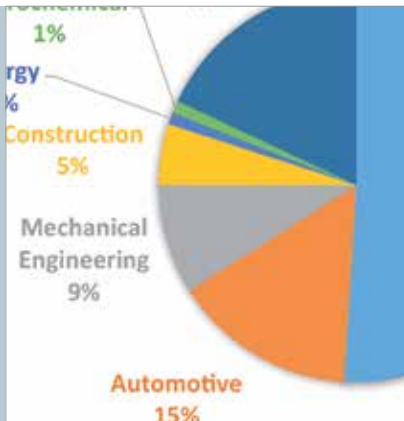
In its own modest way, the ITAtube Journal is also a forum for the exchange of news and ideas. We hope you enjoy this edition and look forward to a fruitful discussion of the many ideas broached within these pages.

Enjoy the read!

Yours sincerely,
Dr. Gunther Voswinckel

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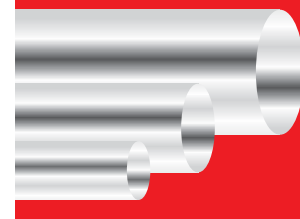


ITA - An Invitation Accepted
ITA Booth Party at Tube 2018

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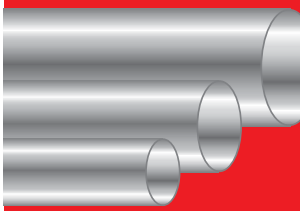
Tube

CHINA



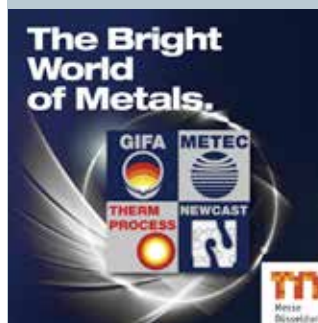
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Tube



India

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World Steel Tube Production – Forecast

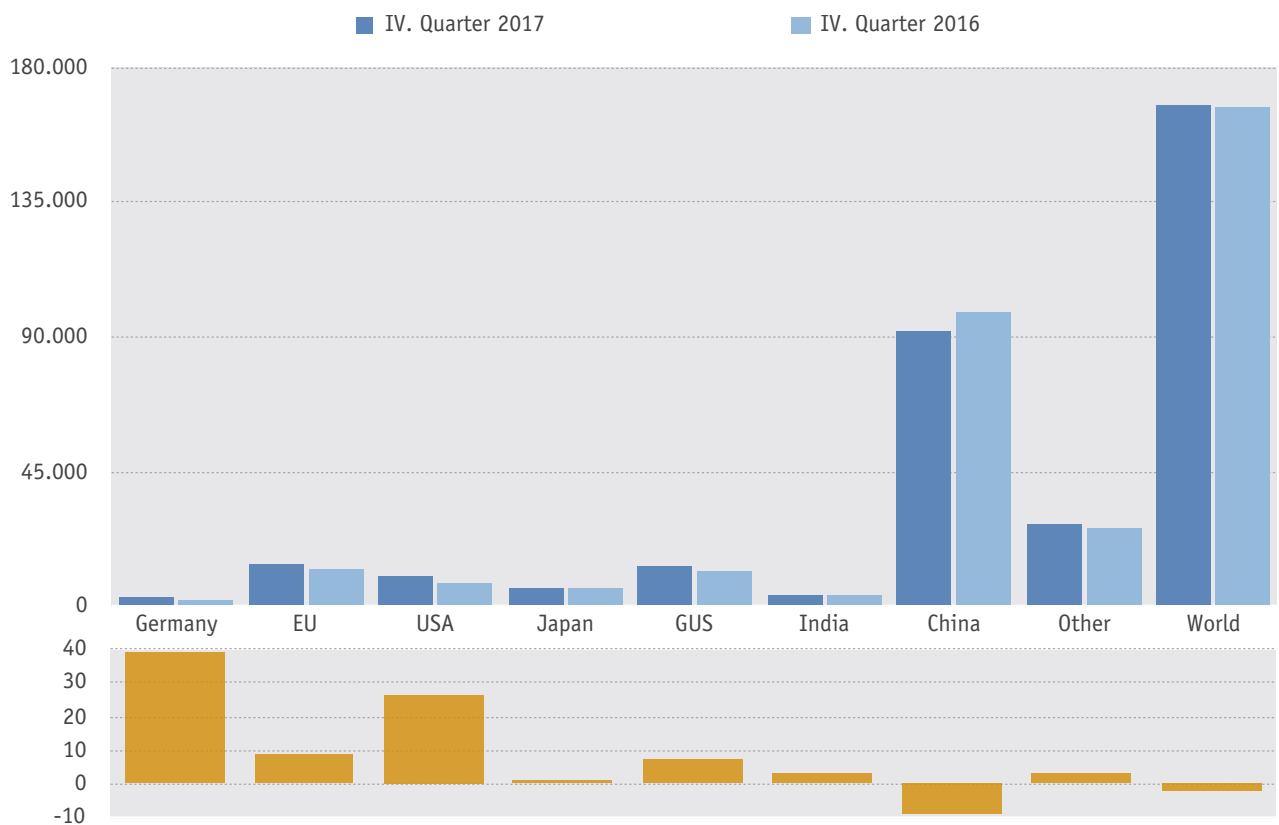
At the end 2017 the World Steel Tube Production reaches 167.2 million tons, an increase of 0.6%. The production of seamless tubes increased 7.4 % to 41.8 Mio

to, significant is the increase in the USA with 74.1 %.

Germany reached with an increase of 87.0 % a positive result in the large diameter pipe market.

Chinese steel tube producers achieved a production of 92,0 million metric tons, a minus of 6.1 %, the USA with a production of 10.5 million tons a plus of 34 %.

Total in Tto.

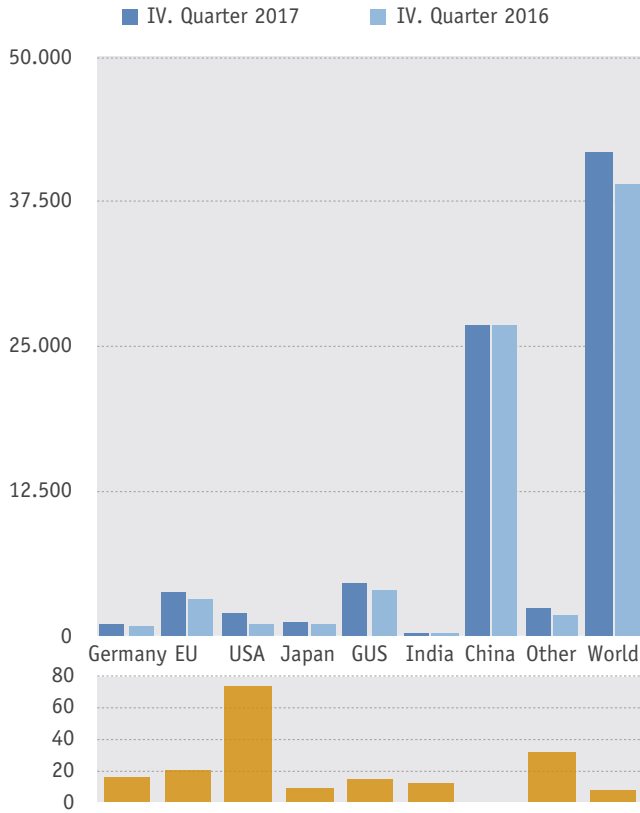


Region/ country	seamless tubes			welded tubes <406			welded tubes >406			welded tubes			TOTAL		
	2017	2016	Change in %	2017	2016	Change in %	2017	2016	Change in %	2017	2016	Change in %	2017	2016	Change in %
Germany	1,213	1,045	16.1	909	868	4.7	1,165	623	87.0	2,074	1,491	39.1	3,287	2,536	29.6
EU(+Germany)	3,962	3,296	20.2	8,357	8,056	3.7	1,599	1,086	47.2	9,956	9,142	8.9	13,918	12,438	11.9
USA	2,068	1,188	74.1	7,319	5,446	34.4	1,123	1,211	-7.3	8,442	6,657	26.8	10,510	7,845	34.0
Japan	4,576	3,999	14.4	6,035	5,562	8.5	2,665	2,535	5.1	8,700	8,097	7.4	13,276	12,096	9.8
CIS	380	340	11.8	1,600	1,500	6.7	2,000	2,000	0.0	3,600	3,500	2.9	3,980	3,840	3.6
India	27,000	27,000	0.0	55,600	61,600	-9.7	9,400	9,400	0.0	65,000	71,000	-8.5	92,000	98,000	-6.1
China	21,000	19,400	8.2	42,950	45,750	-6.1	7,050	7,050	0.0	50,000	52,800	-5.3	71,000	72,200	-1.7
Other	2,580	1,954	32.0	20,147	18,845	6.9	4,664	4,554	2.4	24,811	24,107	2.9	27,391	26,061	5.1
World	41,860	38,971	7.4	102,452	104,982	-2.4	22,889	22,293	2.7	125,341	127,275	-1.5	167,201	166,246	0.6

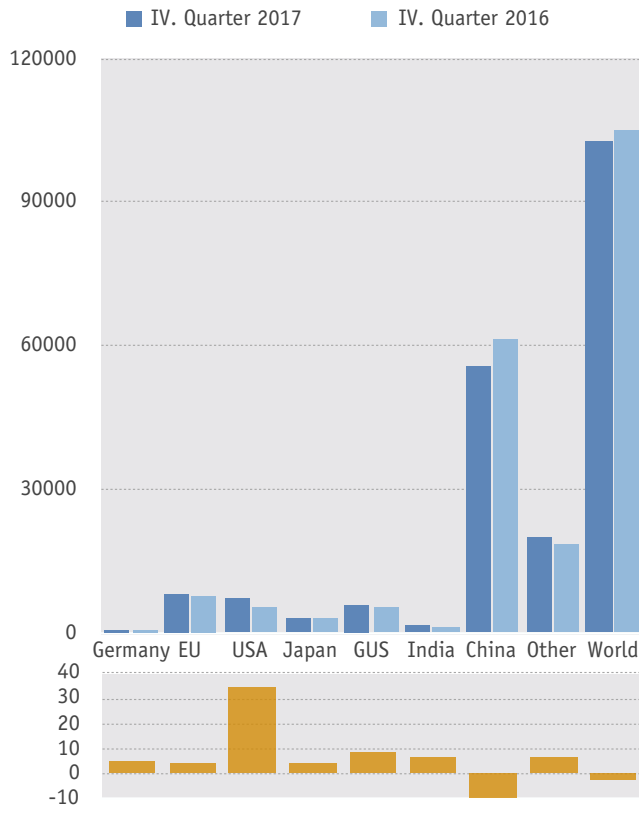
Wirtschaftsvereinigung Stahlrohre e.V.

figures include estimations

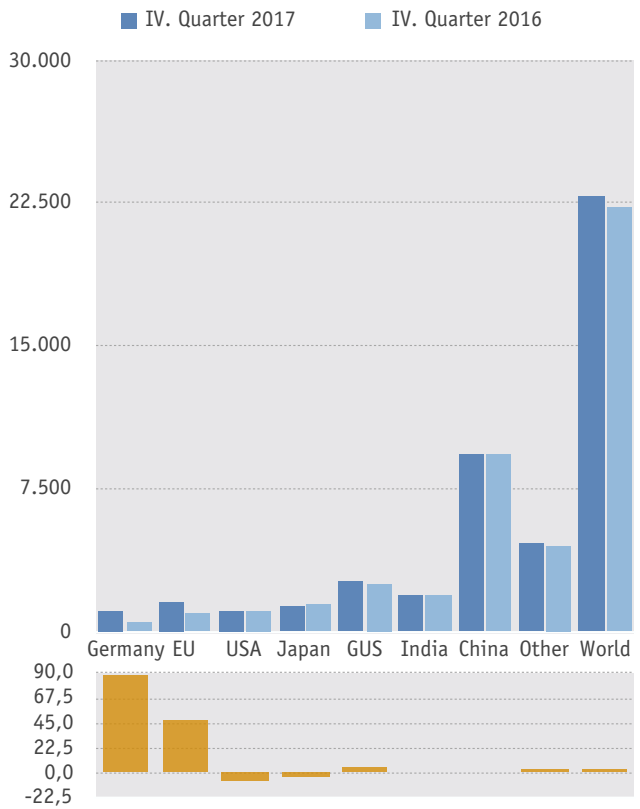
Seamless tubes in Tto.



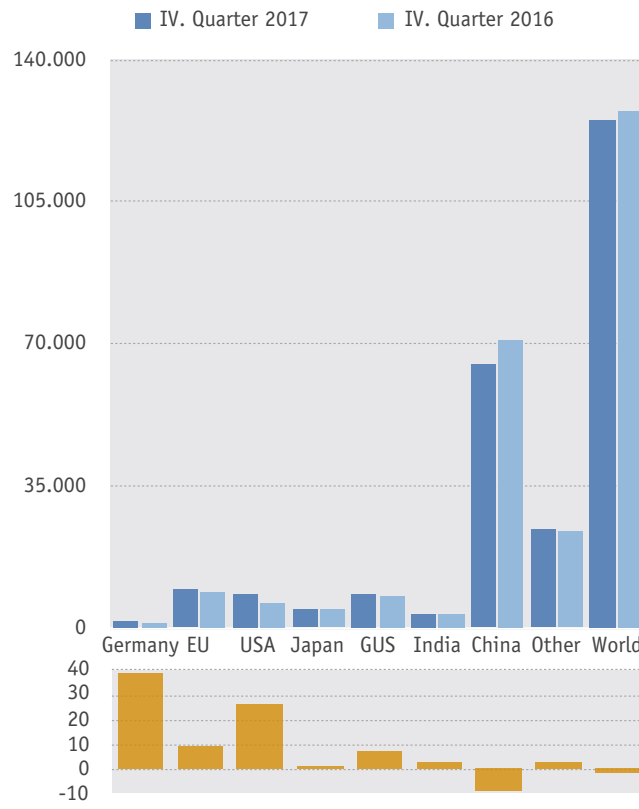
Welded tubes <406 in Tto.



Welded tubes >406 in Tto.



Welded tubes in Tto.



Dr. Gunther Voswinckel, VOSCO GmbH

Pipe & Tube Market – some influencing factors on the present situation

Dr. Gunther Voswinckel – Update as per June 2018

At the end of June 2018, oil prices climbed to a 2 year high of 77 US\$/barrel. Compared to 2016, the price of oil had significantly recovered in 2017 and this trend continues in 2018. This is on the one hand a consequence of reduced oil pumping by OPEC and their partners by about 1.8 Mio. barrel/day, and on the other hand due to the increased world market demand for oil. However, prices remain volatile and some US experts are even warning that the current situation bears similarities to the first shale gas flood offensive in 2014, when oil prices plummeted from 110 US\$ down to 30 US\$/barrel.

The International Energy Agency (IEA) backs up its warnings with figures. The IEA expects oil consumption growth in 2018 of about 1.4 million barrels/day. At the same time it expects that non-OPEC countries, particularly the US, will raise their oil pumping levels by about 1.7 million barrels/day. Citigroup analysts are even predicting a hike in output by the non-OPEC producers of about 2.2 million barrels/day. If the IEA and Citigroup are correct in their assumptions, the world could face an oversupply of oil, with attendant consequences for the tube and pipe industry.

However, despite these assumptions oil prices continue to climb, due largely to recent action taken by the US government. Since US President Trump announced further sanctions on oil-producing giants Iran and Venezuela, including measures to shut down oil exports, the world market has reacted to fears of a new shortage of oil and the upward trend in oil prices continues. Meanwhile, it is remarkable how the US oil and gas industry is taking advantage of the political sanctions being imposed by the US government, and US exports have surged. In this presentation, several other economic consequences for the tube and pipe industry are discussed. Tube and pipe markets such as the automotive, building and construction industry are attractive market segments for our industry and we look at developments there.

World production of steel tubes in 2017 showed a slight increase of 1% as the markets stabilized. In detail, growth of 34% was reported for the US, supported by political trade barriers for tubular products and the strong growth of the shale gas exploration industry due to booming oil prices.

For welded tubes below 406 mm diameter, a small overall production decrease of 2 % was registered for 2017, although the US reported growth of 34 % after major losses (down 18 %) in 2016. In contrast, China registered a downturn of 10 %. For welded tubes of 406 mm or larger, 2017 production was down by 7 % overall. But Europe showed remarkable buoyancy and production growth of 47 %. For seamless tubes, 2017 saw production grow overall by 8 %. Even the US, after a moribund year 2016 (-22 %), reported an increase of 74 %.

Overall, the figures illustrate a remarkable change in trend, since now for the second time in several years, the shift of tube production capacity to China has been reversed in favor of the US and Europe. It would seem that the trade barriers policy is having an impact. Meanwhile, overcapacity is leading to further consolidation in the steel tube industry. The pipe price index, which rose from 260 in January 2017 to a high of 292 in January 2018, has con-

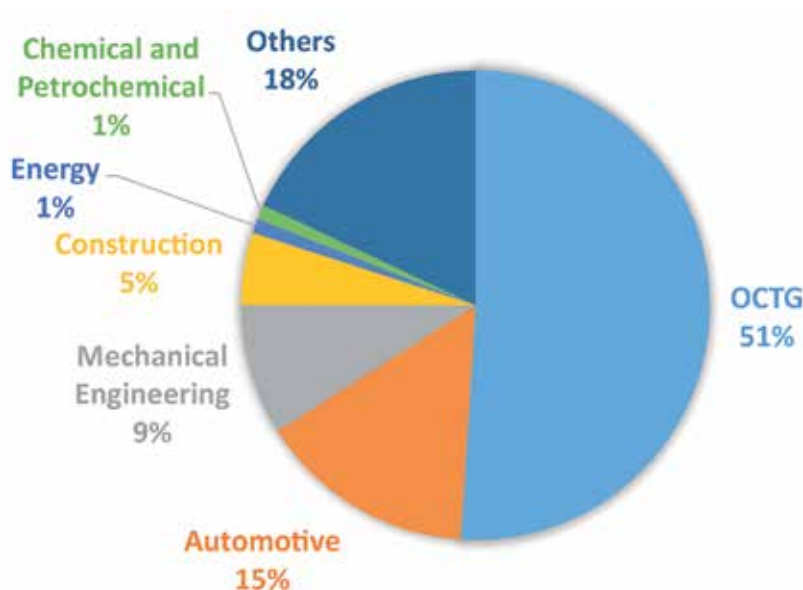


Fig. 1: Markets for Steel Pipe Industries in 2012
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V.

tinued to climb steeply, achieving 332 in June 2018. Competition in saturated markets is prompting minor investments in those tube markets that display growth. More demanding high-tech products are the strategic targets, rather than commodity-grade tubes.

Tube suppliers located in high-cost countries are successfully taking steps to counter the strong international competition. As well as seeking to specialize in products with higher technical requirements, they are globalizing into markets with increased demand and streamlining their productivity to reduce production costs.

Finally, we also discuss the impact of currency exchange rates on the pipe market. Exports from the euro zone were favored in 2016, but the euro strengthened considerably throughout 2017 and into early 2018, which led to export disadvantages. Currently the European currency is falling again, improving export markets for eurozone products vis-a-vis other important currencies.

Looking at the main market segments for steel pipe suppliers, this market is dominated by the OCTG industry (51 %). Besides this, the automotive (15 %), mechanical (9 %) and construction industries (5 %) are also strong market segments for the sector (Fig. 1).

The automotive and construction markets in particular are characterized by stability and high demand.

World car production levels grew overall by about 1% in 2017 (Fig. 2). Regionally, growth rates differed considerably, with growth in Europe (+3 %), Asia (+3 %, dominated by China at +7.4 %) and particularly the Mercosur market

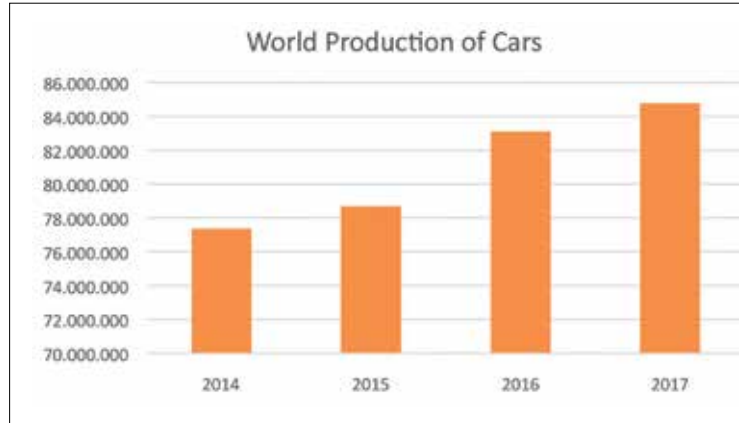


Fig. 2: World car production 2014-17
Source: German Association of Automotive Industry (VDA), June 27, 2018.

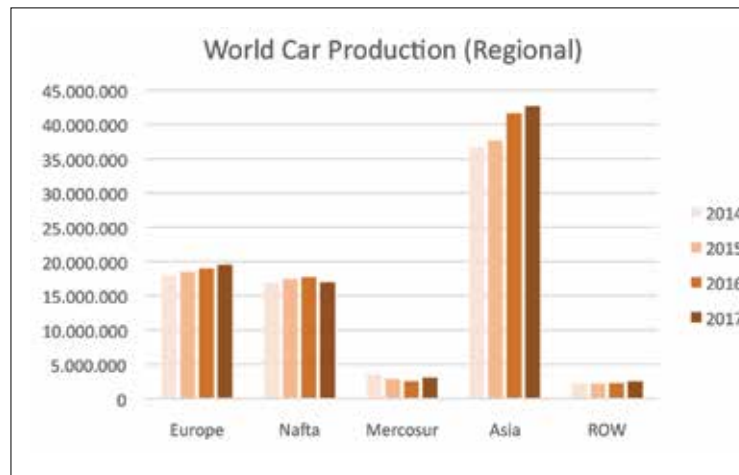


Fig. 3: World car production by region 2014-17
Source: German Association of Automotive Industry (VDA), June 27, 2018.

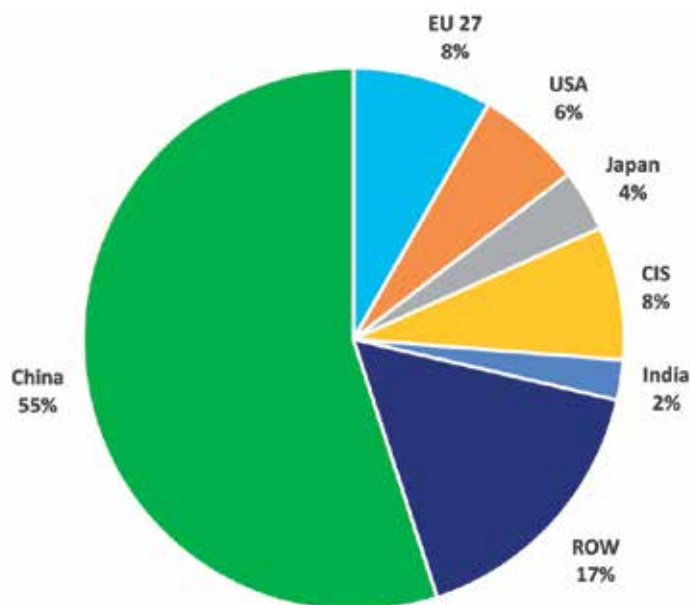


Fig. 4: Global steel tube production by region, 2017
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V.



Fig. 5: Crude oil Brent price as per June 27, 2018. Source: NASDAQ

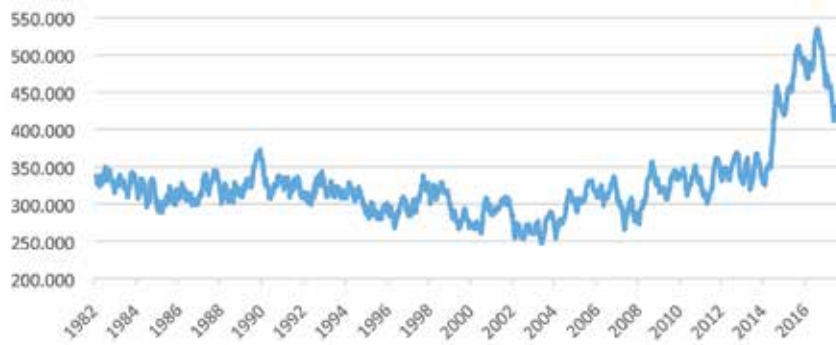


Fig. 6: US crude oil stock volume as per June 22, 2018. Source: EIA

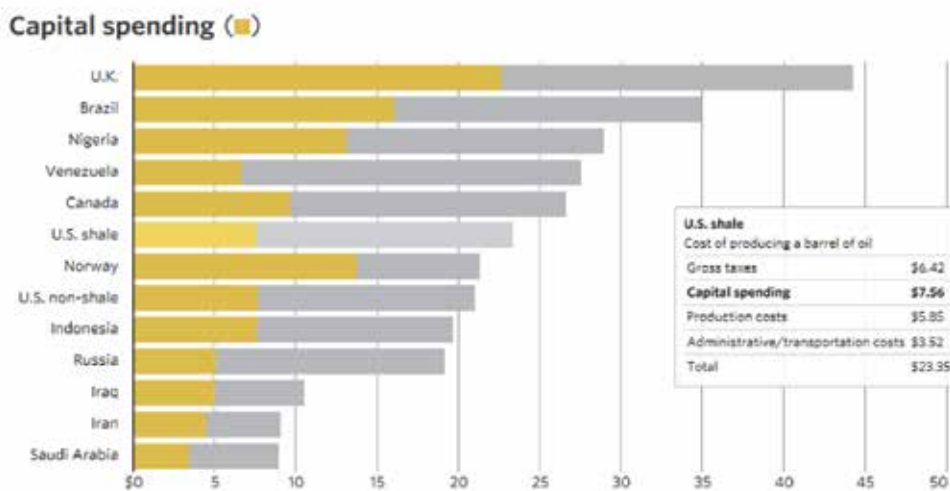


Fig. 7: Cost to produce a barrel of oil
Source: UCube by Rystad Energy, published Feb.16, 2018

(a surge of +20 % after 2 weak years); only the Nafta region showed a downward trend (-4 %) (Fig. 3).

The overall health – and hence attractiveness - of the auto market is amply illustrated by the remarkable growth of 16 % displayed by the German car production industry from May 2016 to May 2018. Since pipe usage in cars is growing in parallel, the automotive market is likely to remain an attractive market segment for pipe producers.

The tube and pipe market in the building and construction industry is smaller but nonetheless attractive due to a world industry growth of about 3.3 % per year (see also ITAtube Journal 4 2015). Urbanization and population growth are the driving factors here.

In 2017, world steel tube production was again dominated by China (55 %), followed by other/ROW (17 %) (Fig. 4). It is worth noting that China's market share was reduced by 3 % from 58 % in 2016 to 55 % in 2017. This was balanced by growth in ROW, EU27 (+1 %) and US (+1 %) market shares.

In 2014 the oil and gas markets were flooded by shale gas products. In the 2nd half of 2014, oil prices plummeted from 110 US\$/barrel to 36 US\$ in February 2016. Subsequently, they recovered overall somewhat, hitting 52 US\$ in August 2017 (Fig. 5), mainly thanks to the OPEC countries and their exploration partners reducing output to minimize the glut. By June 2018, oil prices had climbed to about 77 US\$/barrel.

Analysts were assuming another reduction in oil prices, reflected

in the fact that the crude oil stock volume in the US was recently reduced (Fig. 6). Normally if rising crude oil prices are expected, the storage volume increases, whereas falling crude oil prices lead to an erosion of the crude oil stock volume.

But in actual fact, the price of oil has continued to climb. This is thought to be a consequence of the US President's actions on the stage of world trade. Despite Mr. Trump's eruptions against the OPEC cartel price policy, the sanctions against Iran and Venezuela have caused a significant increase in oil prices. And the stipulation that no country in the world should import any more Iranian oil will simply continue to boost this trend.

Currently, Iran exports about 2.5 million barrels of oil every day. On November 4, 2018, the date that the grace period for Iran comes to an end, the country's oil exports could grind to a halt with further possibly significant effects on oil prices to be expected. Nonetheless, some countries such as Turkey have stated that they will not comply with Mr. Trump's request.

To counter possible shortages of oil in the world market, OPEC, led by Saudi Arabia, agreed to pump 1 million barrels more crude oil per day, with Riyadh agreeing to dip into its reserves "if and when necessary to ensure market balance and stability" – moves meant to help contain the recent rise in global energy prices.

It should be noted at this point, something we come back to later in this article, that the US shale gas industry as well as US tube producers have been quick to take



Fig. 8: Producer pipe price index as at August 11, 2017 (January 1982 = 100%)
Source: US Bureau of Labor Statistics/ Federal Reserve Bank of St. Louis

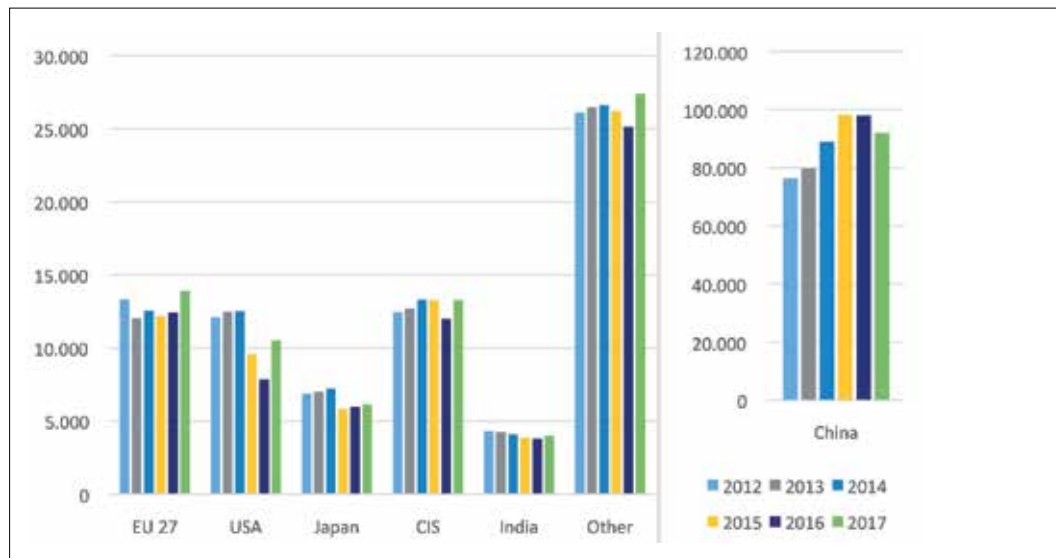


Fig. 9: World steel pipe production in Tons
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V.

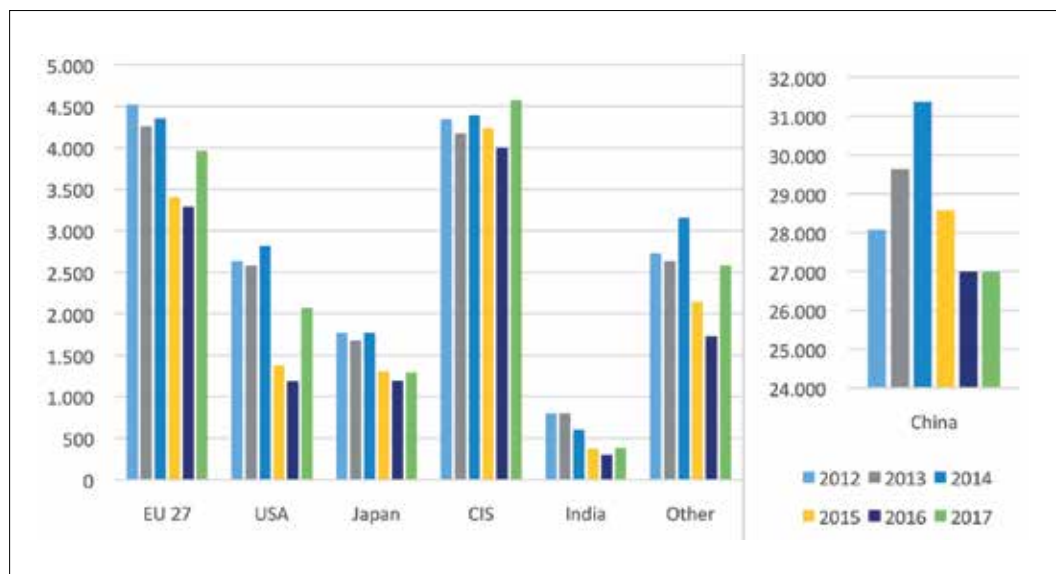


Fig. 10: World steel pipe production in Tons (seamless)
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V.

Market information

advantage of the political measures instituted by Mr. Trump.

Given that many oil-exploring countries have production costs ranging from 30-40 US\$, it is unsurprising that the industry reacts with the utmost sensitivity to current oil price developments (Fig. 7).

Moreover, the entire shale gas exploring industry, regarded in 2014 as a highly attractive industry segment, saw itself forced by previously low oil prices to further reduce its cost level to about 24 US\$/barrel (Fig. 7) – with the

result that its selling price is now much lower than the current price offered for crude oil by the market. In consequence, shale gas production was increased. It is to be expected that rising oil prices will affect a further shale gas boom.

The OPEC countries and some other partner countries such as Russia are currently reducing the oil volume offered to the world market by about 1.8 million barrels/day.

International Energy Agency (IEA) figures show it expects oil con-

sumption to increase this year by about 1.4 million barrels/day.

At the same time, it expects that non-OPEC countries such as the US will increase production by at least 1.7 million barrels/day.

Citigroup analysts are predicting a hike in output levels by non-OPEC producers of as much as 2.2 million barrels/day.

If the IEA and Citigroup are correct in their assumptions, the world could face an oversupply of oil, with attendant negative consequences for the tube and pipe industry. However, this oversupply could well be canceled out by the political sanctions initiated by the US government against Iran and Venezuela.

As a consequence of oil prices soaring, pumping of oil and gas and exploration activities were restarted. This had an immediate effect on OCTG pipe consumption, particularly in the US. Since January 2017, the pipe price index had climbed by about 36 %, or from 244 to 332 (Fig. 8). The positive signals in 2017 had also prompted traders to begin cautious restocking. The renewed boom in prices (77 US\$/barrel by June 2018) continues to have positive effects on the tube and pipe index.

These pipe price corrections certainly left their mark on the world steel pipe production (Fig. 9). 2016 was considered a no growth year. In 2017, global tube production increased slightly (1 %). Looking at regional statistics, it is notable that only China (-4 %) displayed a downturn in pipe production. All other regions increased their production figures (US +34 %, EU +12 %, CIS +13 %, ROW +9 %, India +5 %).

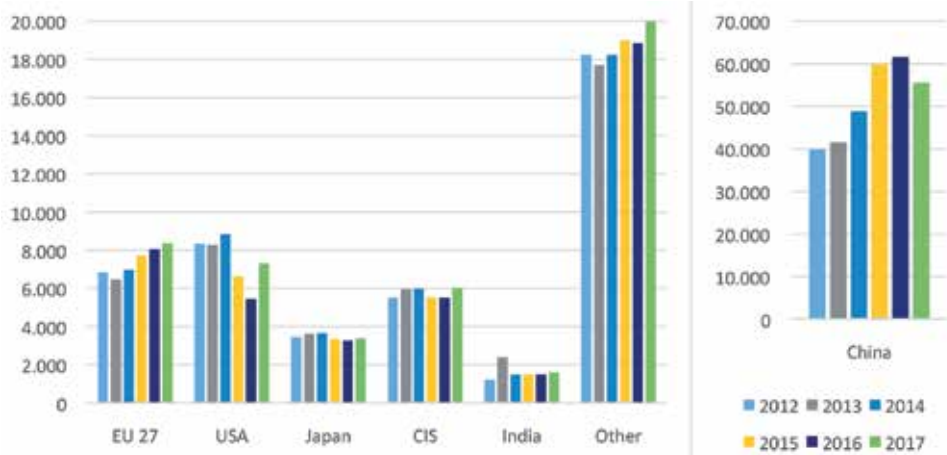


Fig. 11: World steel pipe production in Ttons (welded < 406 mm OD)
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V

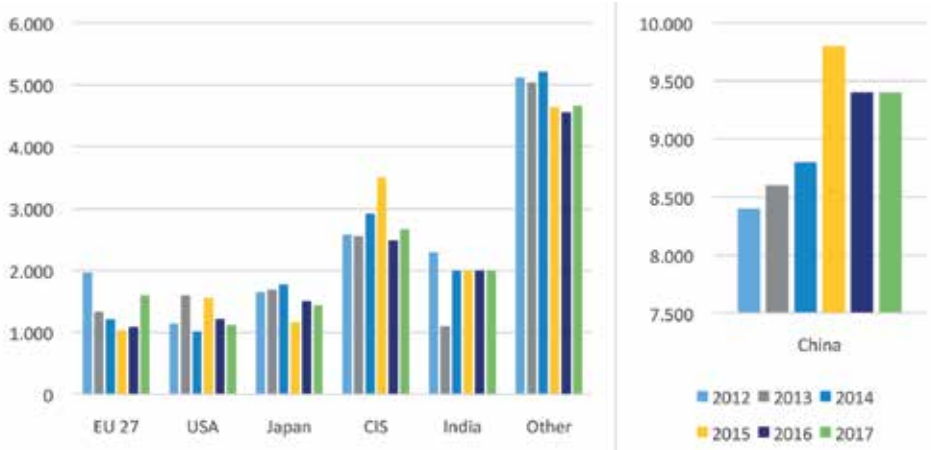


Fig. 12: World Steel Pipe Production in Ttons (welded >= 406 mm OD)
Source: ITAtube Journal/Wirtschaftsvereinigung Stahlrohre e.V.

The most significant variations were seen in the market segment seamless pipes and tubes (Fig. 10). Global production volumes increased by 8 % in 2017, dominated by the US (+74 %), other territories/ROW (+49 %), India (+27 %), EU (+21 %), and CIS (+15 %). China with the largest production volume did not increase its market share.

The production of welded pipes < 406 mm OD saw a slight global production volume decrease in 2017 (-2 %). China once again reported the most significant decrease (-10 %). All other regions reported an upturn in production volume: US (+34 %), CIS (+10 %), India (+7 %) and Europe (+4 %) (Fig.11).

The figures for welded pipes ≥ 406 mm OD, large diameter line pipe, also show an overall production decrease of 7 % in 2017, most marked in the US (-7 %) – although new US import tariffs on line pipe imports have had their desired effect and have slowed the downturn on home markets. The negative trend reflects the decreased demand for pipelines in these regions. The pipeline market is dominated by large projects, which are mostly politically driven. Europe, on the other hand, increased production (+47 %) and has further strengthened its position as a technologically advanced producer of large diameter line pipe (Fig. 12).

In the entire scenario, currency exchange rates have also had a significant impact on pipe exports and pipe manufacturing machinery exports throughout the world.

From the second half of 2014, the euro lost about 20 % against the US Dollar (US\$) (Fig. 13). Then, in 2016, it managed to hold its



Fig. 13: Currency exchange rates vs euro as per June 27, 2018
Source: Finance.net



Fig. 14: Currency exchange rates vs euro as per June 27, 2018
Source: Finance.net

value against the US\$ at around 1.07. Throughout 2017 until February 2018, the euro strengthened against the US\$ by about 17 % to 1.25. Since then it has dropped again by about 7 %, which has helped to lessen the pressure on exports into the US.

In 2017, the exchange rate of the euro to the Chinese yuan also improved, by about 7 %. In early 2018, it fell again by about 5 % - thus helping to balance out the export advantages enjoyed by China.

The value of the Russian rouble remained relatively stable in the latter half of 2017 at a level of about 70 roubles/euro. This meant that local pipe producers

to a large extent served the home market, to compensate for export losses. So far in 2018, the rouble has strengthened by about 8 % against the euro (Fig. 14).

From January 2017 (4.0) to February 2018 (4.7), the exchange rate of the euro to the Saudi Arabian riyal (SAR) gained about 18 %. This meant that imports from Saudi Arabia to Europe became significantly less expensive, although since then the riyal has dropped again by some 6.5 %.

As indicated by these latest figures, US tube and pipe producers in particular have greatly profited from the political climate created by the US government and the resultant business trends on

the oil market. Increased pumping and exploration activities are the primary driving forces of the market's recovery in the US. If we believe the US experts, this trend will continue throughout 2018. And to a lesser degree European tube and pipe producers were also able to profit from these developments.

What measures are pipe producers and plant equipment suppliers taking to overcome current difficulties and to generate sustainable business? Over-capacity is leading to consolidation in the steel tube industry. Several pipe producing companies are still looking into overcoming such capacity problems by closing production facilities with a questionable economic future.

Still, despite the remarkable boom in the US, globalization into markets with increased demand remains one of the key answers.

The Middle East and locations with major automotive production are to be considered. Besides this, shale gas exploration, deep-sea offshore exploration and oil sand exploration remain major challenges for our industry.

Price competition from China and elsewhere demands further specialization in high-tech products. This applies in particular to regions with high production costs. The producers seem to have evaluated their market approach and decided to serve commodities or high-tech products even if they only represent niches. Some countries/regions have also installed trade barriers to limit imports from other countries.

Finally, every producer has to make permanent improvements to increase productivity and reduce production costs. Technology suppliers may find interesting business opportunities in this field.

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Pressure is mounting



It is no longer a rarity for oil companies to tap resources at depths of up to 10,000 metres (33,000 feet) below sea level – a development which is of course having a major impact. And it's also a dramatic change with consequences for the pipe and tube industry.

Easily accessible offshore oil deposits are beginning to run out. So to obtain this valuable raw material from new sources, drilling now needs to go much deeper – and this is clearly a technical challenge. Quite often, therefore, fixed oil rigs are accompanied by floating ones. According to Evonik, it means laying flexible pipelines instead of using rigid steel – lines that need to be protected against seawater corrosion on the outside and against oil, gas and water damage from within. “Moreover,” says Evonik, “the deeper you go, the more you need to reduce the weight.”

Steel and plastic

Pipes which are suitable for this purpose have been unravelled and laid, for instance, some 12 km

(7.5 miles) off the Scottish coast, where oil is now being extracted from the seabed via pipelines, using a floating rig.

“The movable pipes have wall thicknesses of at least 6 cm (2.4 inches),” says Evonik. Also, they have at least eight coats, some made from steel and others from VESTAMID® NRG polyamide. While the steel coats mainly serve to provide reinforcement, the plastic layers ensure that the pipes stay tight. “The pipes are resistant to saltwater and also to any of the chemical compounds in the oil.” An inner coat of VESTAMID® NRG keeps the oil safely within the pipelines, which can be up to 350 mm (1.4 inches) in thickness. On the outside another plastic layer serves to protect the steel from seawater corrosion. “Pipes with VESTAMID® NRG have been laid not only in the North Sea, but also, for instance, offshore near the Brazilian, West African and Australian coasts.”

Pipes are getting lighter

The deeper a company drills, the more it needs to pay attention

to the weight of the pipeline. To enable oil extraction at extreme depths, i.e. below 2,500 metres (8,200 feet), Evonik has worked with the Dutch pipe manufacturers Airborne. The result is a lightweight composite pipe which consists entirely of VESTAMID® NRG, reinforced by glass fibre. The Malaysian mineral oil company Petronas, for instance, is planning to use offshore pipes without any steel whatsoever.

The worldwide extraction of oil and gas on the high seas requires innovative and complex pipes made from high-quality materials. This is the trend which Schoeller Werk has followed for a number of years now. It has developed some highly robust control line and chemical injection pipes, made from stainless steel and nickel-based alloys and which can be used at a depth of 10,000 metres (33,000 feet) below sea level. They pump chemicals into the oil reservoir and serve as hydraulic control lines for safety valves. “Thanks to the excellent quality of their surfaces and especially also their welding seams, these pipes can withstand extreme conditions, such as high pressure, temperatures up to 300°C, aggressive media and saltwater,” says Markus Zimmermann, head of Energy Sales at Schoeller Werk. “Users benefit from secure installations with above-average lifetimes.” In addition, the company’s portfolio for offshore oil customers includes a wide range of services, such as the encapsulation, flushing and filling of pipes.

High-performance materials are in demand

Schoeller Werk has identified a trend whereby the most important requirements on offshore pipes are dimensional stability and corrosion resistance. "So our customers often decide for high-performance materials such as alloys," says Markus Zimmermann.

However, the production and transportation of oil and gas requires not only efficiency, but also safety. Although safety standards are already very high, they still need developing. "As pipe manufacturers, a large part of our steel pipes go to the oil and gas industry where they play a major role in the ongoing minimisation of risks," says Dr. Bissel, Vice President Sales Europe/Africa from the steel pipe manufacturers

Vallourec. Industrial safety and environmental protection have always been central issues in the oil and gas industry and are therefore also crucial priorities for suppliers, including the steel pipe industry. "All stakeholders need to have an assurance of the highest possible safety. Even under today's cost pressure," says Bissel, "the industry mustn't lose sight of a vital priority: 'safety everywhere and at all times.'" For environmental reasons Vallourec now also offers pipe connections that can do completely without lubricants (Cleanwell).

Competition from fracking

Intense pressure can be felt by the oil and gas industry not just deep down below sea level, in their pipelines. But the demand situation, too, has developed far less posi-

tively than expected. "Following the Arab Spring and thus high expectations in the Middle East, a large number of projects were initiated which subsequently caused over-capacities," says Dr. Dirk Bissel. At the same time, the increase in productivity and therefore competitiveness of US shale gas was clearly underestimated.

So-called fracking – extracting oil and gas from shale stone – is very much in competition with traditional oil production at the moment and is increasing the volume of oil that is traded throughout the world, says Markus Zimmermann from Schoeller Werk. Any decisions by OPEC to stabilise oil prices and to reduce the production volume are therefore having relatively little impact.

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More orders expected in 2018 again

The offshore industry has been highly volatile over the last few years. "The sharp drop in oil prices has led to a decline in sales here recently," says Dr. Zimmermann, "resulting in fewer orders from energy companies." But there may well be a trend reversal soon. "We reckon there'll be some slight recovery over the next few years, so that – like other suppliers to the offshore industry – we're likely to receive more orders again in 2018."

There has also been considerable pressure on the Norwegian oil industry. Norway is particularly well known for its big oil and gas industry, which contributes around 20 per cent to the country's annual economic output. Norway is now having to secure its position on the oil market for the next 30 years.

Production due to start in late 2019

All the relevant conditions are in place, as there are enormous oil and gas reserves just off the Norwegian coast. One of them is the Johan Sverdrup Oil Field, one of Norway's biggest oil fields, with an overall volume estimated between 1.7 and 3.0 billion barrels. The deposit is situated 120 metres (400 feet) below sea level and is 1,900 metres (2,600 feet) deep. The entire area covers around 200 square kilometres (77 square miles).

About 12 billion euros is being invested in the first stage of development. This includes the drilling holes, installing feed pipes and particularly also setting up four fixed platforms. "These are a processing platform, a riser platform, a drilling platform and a living quarters platform, all connected

by bridges with lengths between 80 and 100 metres (60 and 330 feet). Two further platforms will be added at the next stages. Once production has started at the end of 2019, Norway is expecting to extract oil from this field until 2050. Day by day, a pipeline will then take some 550,000 barrels to the Mongstad Terminal in Hordaland.

Over 1,400 tonnes of total weight

Butting received a contract for the production of longitudinally welded pipes for all four platforms and also for the connecting bridges. "The requirements on materials at sea are very high due to the enormous stress caused by the salty air. Butting therefore used 6 Moly, 316L, Duplex and Superduplex as materials," says Christian Schenk from Sales CRA Pipes. The dimensions of the pipes, made and delivered by Butting, range from OD 2" to 30" with lengths of 6 to 12 metres (20 to 40 feet). The pipes supplied to the Johan Sverdrup Oil Field had a weight of over 1,400 tonnes in all.

The transportation of energy is a major focal area in nearly all of Europe, e.g. the Trans-Adriatic Pipeline (TAP) which forms part of the Southern Gas Corridor, due to take gas from Azerbaijan to western and south-eastern Europe from 2020 onwards. It connects with the Trans-Anatolian Pipeline (TANAP), runs through Greece, Albania and the Adriatic Sea, and eventually reaches Italy, covering around 870 kilometres (540 miles) in all.

Engineering Supports and Trainings

Almost one third of the TAP pipeline was supplied by the Salzgitter group via its international trading organisations. This included 270

kilometres of large-diameter pipes of the EUROPIPE joint venture and 1,559 pipe bends supplied by the pipe bending plant in Mülheim with a total tonnage of some 170,000 tons for the onshore area in Albania. More than 71,000 tons of large-diameter pipes are scheduled for the 105 kilometres long offshore part of this pipeline along the Albanian coast to Italy. A top order at its best.

What are today's expectations on suppliers to the oil and gas industry? According to Vallourec, there is currently an increasing demand for pipe-related services, especially technical consultancy and application-focused training, ranging from lectures for drilling engineers to training sessions for entire rig crews. Lifetime management, too, is gaining in importance. The aim is "to provide highly efficient technical systems that will give each customer maximum support in reaching their cost optimisation target. The customer looks at the entire cost of a given investment, including running expenses and also any repairs and servicing that may be required. It's the total cost of ownership that matters," says Dr. Dirk Bissel from Vallourec.

Service along the entire lifecycle

Comprehensive solutions are expected in all the product segments of a seamless pipe manufacturer – OCTG, line pipes, drill pipes and Serimax welding services – covering the full range, from simple tasks to high-end solutions for complex operations in oil and gas fields.

Such services often accompany the entire lifecycle of a product and project. Technical support starts at a very early stage, "so

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that the customer can receive support and advice in choosing the most efficient technology," says Bissel. As pipe manufacturers, Vallourec, for example, provides a system called Cleverscan for optimising the welding of pipe ends. This service goes far beyond the production of seamless pipes.

More realistic demand forecasts

But even though there are positive indications in the development of the oil and gas industry and therefore also positive effects on the steel pipe industry in 2018, Dr. Dirk Bissel from Vallourec can see "uncertainties in the demand forecast". They depend on developments of business activities in the BRIC states, though also in Europe and America. The demand is apparently there, and new projects are being launched throughout the world.

Nevertheless, "projects will be scrutinised more critically for their economic viability, and positive decisions will be based on far more realistic demand forecasts and price developments," sums up Bissel. Although, in the medium term, a boom in demand is unlikely, "the market situation will stabilise at a healthy level," as oil and gas will continue to be an indispensable source of energy for a very long time.

Questions for the future

However, there are questions about the future. "We, too, would like to know what the future relationship will be between fossil fuel and renewable energies," says Markus Zimmermann, head of Energy Sales at Schoeller Werk. Decisive factors will include new developments and political decisions.

Yet alongside traditional oil and gas production, we will also see new business segments opening up. What Vallourec finds particularly interesting for Europe is solutions in the geothermal sector – another industry with some good depth and good future prospects. The oil and gas industry will continue to demonstrate its ability to handle pressure.

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China is in urgent need of environmental technologies – a huge market is opening up

Dirty rivers, heavily polluted ground water, water scarcity and poor air quality in large cities not only harm people, but also China's economy. This can no longer continue. Stricter environmental laws in Chinese state leadership should flip the switch and contribute to the health of the country. But without suitable environmental technologies – particularly from the piping industry – this will not succeed. Companies from around the globe can expect lucrative contracts.

"Urbanization is a worldwide phenomenon," reports Germany Trade & Invest (GTAI): Half of the world's population lives in a city today. According to the UN, by 2030 the number of megacities will rise to 41 worldwide, each with over 10 million inhabitants and thus increase the rate of urbanization to 60 percent". This poses great challenges for the cities in question," according to GTAI. Especially as there are also forecasts that believe that in China in particular there could be an increase to about 220 million-population cities by 2025.

Rapidly increasing urbanization

This is a consequence of development that China has been experiencing for some time now. Rapidly increasing industrialization and urbanization pose major problems for large cities such as Shanghai and Beijing. This development has made it difficult to structure a well-functioning water system, meaning large parts of the population cannot be supplied with clean drinking water, explains the German Federal Ministry for Economic Affairs and Energy. Even today, around 100 million people in China have no access to clean drinking water. The same time, water demand will increase by more than 500 billion cubic metres between 2005 and 2030. Water scarcity is particularly prevalent in the 'dry' north of China.

On top of that, contaminated wastewater from industry reaches the ground water and rivers unfiltered, reports the Federal Ministry and 57 percent of ground water ranks bad or very bad in quality estimates. In addition, there is a great shortage of industrial and public wastewater treatment systems. But it's not only megacities suffering from this shortage. Rural areas are not experiencing the economic boost that could be possible, as a lack of water resources is putting the brakes on this.

Extensive investments in China

The situation in China is that the danger has been recognized, but not quite put to a stop yet. For several years, the Chinese government has been making "substantial investments in the expansion of the necessary infrastructure," according to the Federal Ministry. However, experts believe that investment in water and sanitation infrastructure so far has not kept pace with China's rate of urbanization.

Meanwhile, China intends to tackle its water problem with two strategies: transport and water treatment. One project to provide the required amount of water to the arid north of China is the South-North Water Transfer Project, the construction of which began in the mid-1990s. This will provide for the transport of 3.6 billion cubic metres of water per year over a distance of around 1,200 kilometres. Numerous pipes have already been installed and two of three routes have now been completed. By 2050, it should be possible to transport 44.8 billion cubic metres of water each year. The estimated cost of the project is approx. 500 billion US dollars.

Water management has become more professional

A mega-project, but one that cannot solve the fundamental problems with sewage. But here, too, there is progress. "China's water management has clearly become more professional," summarizes GRAI. The professional-



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Schuler has already implemented machine monitoring in other production lines, e.g. for the manufacturing of railway wheels.



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ization and privatization of the water sector has also increased the need for modern technology and energy-efficient solutions.

And there has already been some success: according to the Chinese Ministry of the Environment, for the first time in five years, the proportion of highly contaminated ground water was reduced to 14.7 percent in 2016. However, huge investments are still needed in the wastewater sector and in sewage sludge treatment. The Clean Water Action Plan sets a reuse target of 20 percent or more in water scarce areas by 2020, according to the Country Case Study in the International Trade Administration's (ITA) "2016 Top Markets Report Environmental Technologies". It can be said that the potential for export companies in the water infrastructure area is correspondingly large. Especially as China's scarce freshwater resources for water efficiency and reuse are of particular importance.

An opportunity that the Achern-Fautenbach-based Fischer Group, for example, has recognized. The company will exhibit at China's most important trade fair for Tubes and Pipes, Tube China, to be held in September, 26 to 29, 2018 in the New International Expo Centre (SNIEC) in Shanghai.

The company manufactures laser-welded stainless steel pipes for drinking water installations in accordance with German DVGW regulations. Using stainless steel, the Fischer Group wants to make a contribution to ensuring that safe drinking water also arrives safely with people in the installation systems. "That would work the same way in China," explains Hans-Peter Fischer, Executive Partner at the Fischer Group.

Pipes, valves and monitoring equipment

Key technologies required over the next few years include waste handling equipment, membrane filtration, waste to energy technology, nitrification, biological denitrification, monitoring equipment and testing equipment, according to the ITA Country Case Study.

The ITA Country Case Study also states that the plan calls for remediation or replacement of all transmission pipelines in service for more than 50 years with a goal to reduce non-revenue water to 10 percent by 2020. A mixed sewerage system and the introduction of rainwater systems that include storage and reuse, as well as rainwater drainage systems that promote ground water formation should contribute to this. Sought-after key technologies include pipes, pumps and valves, storage technologies, SCADA systems, monitoring systems, leak detection equipment, trenchless technologies, catchment design and construction, and pipe rehabilitation technologies.

Companies invest in China

Companies from all around the world have already discovered the Chinese water, sewage, power plant, chemical, pipeline and energy markets. Companies such as Butting. The pipe manufacturer has been manufacturing in China since 2005. In 2011, another production facility was added in Tieling, the dry north of China. "We are optimizing and expanding our manufacturing capabilities for container construction, piping systems and ready-to-install components with this investment," explains Butting.

At the end of 2016, (Salzgitter) Mannesmann Stainless Tubes opened a new sales channel for

Powergen tubes in China with China Water Resources & Electric Power Materials & Equipment Group. At that time, the company explained that, in addition to the pipe business with existing customers in new power plant construction, the company now also has a well-established partner for the maintenance and repair business. An important segment in Mannesmann's product range, a manufacturer of seamless stainless steel and nickel alloyed pipes, boiler pipes are those "on which the highest demands are placed". These can be found in biomass and waste incineration plants, among others.

Fischer Group is currently investing in a new production facility for the production of stainless steel pipes for the commercial vehicle industry in Taicang, China. Housing shells made of stainless steel have been developed for automotive electric motors from BEV, "which with a certain probability will also receive series status in China," says Hans-Peter Fischer, Executive Partner at the Fischer Group. These are put into operation in Taicang.

Background: In the commercial vehicle industry, conversion to the "China 6" emissions standard is pending for all trucks and buses. "Austenitic stainless steel pipes are needed as they function in exhaust system technology," explains Hans-Peter Fischer.

Serenergy's fuel cell technology, a wholly owned subsidiary of the Fischer Group, "is suitable as a range extender for the Battery Electric Vehicle (BEV), for example in local buses, passenger cars, but also as a replacement for diesel generators, as well as for the energy supply of passen-

ger ships while in harbours". It is planned to expand the Fischer plant in Taicang, which will also create production space for fuel cell technology. An issue that is currently being considered by the Taicang administration.

There is no question that China is a very attractive market for companies. And it is a market in which, from the point of view of the Fischer Group, a lot is going on. "The Chinese government is very committed to developing new environmental technologies and will make these faster and more efficient than anywhere else in the world through their decisions," says Fischer.

"For us, in addition to the core business of producing laser-welded stainless steel pipes, we also see good growth opportunities for our company in fuel cell technology, truck exhaust gas detoxification and passenger cars (BEV or hybrid). Finally, it is also our contribution to being able to play a part in China's environmental policy."

And this contribution has already begun: The Fischer Group has already developed projects with Chinese companies in the field of exhaust gas detoxification, maintains contacts with Chinese OEMs in fuel cell technology, has already supplied fuel cells and range extenders for series testing and has equipped buses with this for testing. The Fischer Group wants to be perceived in China as a "Group for Environmental Technologies", says Hans-Peter Fischer.

Increase in sewer sludge treatment

However, in order to shoulder the further success of the water and

energy issue, it is important to continue to invest heavily in the future. According to estimates by the Chinese Ministry of Construction, nearly 85 billion US dollars are needed to meet the wastewater treatment targets outlined in the 13th Five-Year Program - 2016-2020, GTAI reports. In the cities, for example, 95% and in towns at least 85% of the wastewater will be treated. The sewage sludge treatment capacity is to be increased two and a half times by 2020 to 97,500 tonnes per day.

With the amended environmental protection law (EPL) and the updated Air Pollution Law from the past years – to name just a couple of examples – China is serious about its efforts to provide clear (water) conditions. Even environmentalists see a comprehensive political document in a ten-point program with 238 individual measures enacted in 2015. This can also be seen as a turning point. Environmental law not only drastically increases possible fines and compensatory payments, but for the first time it also enforces the prosecution of those directly responsible. The Water Pollution Prevention and Control Law, which came into force on 1 January 2018, aims to further improve drinking water quality.

Revising the lack of implementation

Strict implementation of legal requirements has been lacking in previous years. One reason for earlier halting implementation is that environmental regulations are enforced at city and provincial levels through local Environmental Protection Boards (EPBs). The EPBs answer to the mayor or provincial governor, whose promotion potential as a party official is

based primarily on demonstrating economic growth. This dynamic assures that environmental goals are almost always subordinated to economic development goals, according to the ITA Country Case Study. The revised Environmental Protection Law (EPL) may serve as a remedy to such systemic weaknesses in enforcement by incentivizing environmental protection in bureaucratic performance measures and penalizing those who fail to enforce the law with demotion, dismissal and potential criminal prosecution. This sets a precedent for greater compliance with environmental regulations.

Companies as suppliers

According to GTAI, the lead of EPC projects (Engineering Procurement Construction) lies with local construction companies or construction development companies. Foreign companies are often limited to controlling and consulting. However, German companies keep coming back as suppliers.

As mentioned, the need for environmental technologies is great beyond measure. A development like bringing water to the mills of innovative companies...

Pipe and Tube Processing Machinery, Tube Trading and Manufacturing, Profiles, Bending and Forming Technology and Tube Accessories will be presented at Tube China from September 26 – 29, 2018 in the New International Expo Centre (SNIEC) in Shanghai.

Tecnar Automation Ltee

Novel signal processing of on-line wall thickness gauge profiles for production monitoring of hot seamless steel tube plants



Fig. 1 Lut revolution

INTRODUCTION

Seamless tube manufacturers are under constant pressure to increase yield and productivity of their plants, especially in the current difficult times. Proper process monitoring at every stage of the manufacturing steps is critical in achieving such goals. For seamless tube manufacturing, in particular, there are constant changes in production results due to the unavoidable wear of the production tools. Getting a complete picture of the production process requires the inspection of each and every tube produced at several stages of the manufacturing process. Operators may then be automatically alerted before tube characteristics, such as dimension or temperature, falls outside target ranges. By tracking the slow changes in production parameters due to wear, maintenance may then be planned on demand, instead of on schedule (after a given number of tube produced). In other words, earlier insight changes everything.

Valuable information is provided to plant operators and plant manager by sensors located at critical locations on the production line. Tecnar's Lut Revolution (Lut) is one such sensor. The Lut revolution gauge, shown in Figure 1, is a noncontact ultrasonic wall thickness, temperature and length measurement system, specifically designed for process monitoring of hot seamless steel tube production. The wall thickness measurement is based on laser-ultrasonics, which is a novel versatile technology, compatible with every stage of the production process. The Lut may be used immediately after piercing of the billet all the way up to the output of the sizing mill, from the beginning to the end of the hot seamless tube manufacturing process.

Since the sensor is based on noncontact ultrasonics, the presence of the mandrel inside the tube as well as tube motion (both forward, rotational and lateral) has no effect on the capability and on the accuracy of the measurements. The Lut has been specifically designed for use in the harsh condition of a tube mill. By introducing new analytical tool to process the data from the Lut, operators and production managers may quickly understand what's going on the production mill, react quickly to out-of-specifications conditions, and reach their production goals.

THE LUT REVOLUTION

The Lut Revolution, shown in Figure 1 at the output of a stretch-reducing-mill, is a sensor based on laser-ultrasonics. Laser-ultrasonics is a technology that combines the accuracy of ultrasonic thickness gauge with the flexibility of an optical system. A first laser is focused on the surface of the tube, causing the generation of short ultrasonic pulse or

“ping”. The ping then propagates through the wall of the tube, is reflected by the back wall until it reaches to front surface, the point of origin. The forward and back propagation of the ping is repeat several times, until the sound energy is fully absorbed or scattered by the material of the tube. Each time the ping arrives at the surface, it affects a second laser, the detection laser, which “records” the signal. The detection laser acts as a microphone, listening to the arrival of the pings. By measuring the time between the reception of two successive pings, one may determine the time of propagation of the sound within the bulk of the tube. Knowing the velocity of sound in the hot material, the wall thickness at the precise location of generation of the ping may be measured. Repeating the process along the length of the tube provides an accurate thickness profile.

Since laser light is used to both generate and detect the ultrasonic pulse, the measurement is non-contact and, therefore, not affected by tube motion or tube temperature. In addition, since the ultrasound is reflected by the back wall of the tube, the presence of a mandrel inside tube has no effect on the wall thickness measurement accuracy. As the product is moving under the probe, measurements are taking along the length of the tube, given the operator a wall thickness profile as shown in Figure 2. The operator can then use the information to determine if the product at this location is within the target specifications or if remedial actions are required.

As the product is moving under the probe, measurements are taking along the length of the tube, given the operator a wall thickness profile as shown in Figure 2. The operator can then use the information to determine if the product at this location is within the target specifications or if remedial actions are required.

INFORMATION FROM WALL THICKNESS PROFILE

With the information provided with each wall thickness profile, the operator can quickly, in a first step, verify that the wall produced is within the nominal target values. The operator may then stop production to react if out of specification conditions are observed and reduce the production of “scraps”. Production yield may also be increasing by tracking the length of heavy or light wall at both ends of the tube. Using the wall thickness profile, operator may adjust production param-

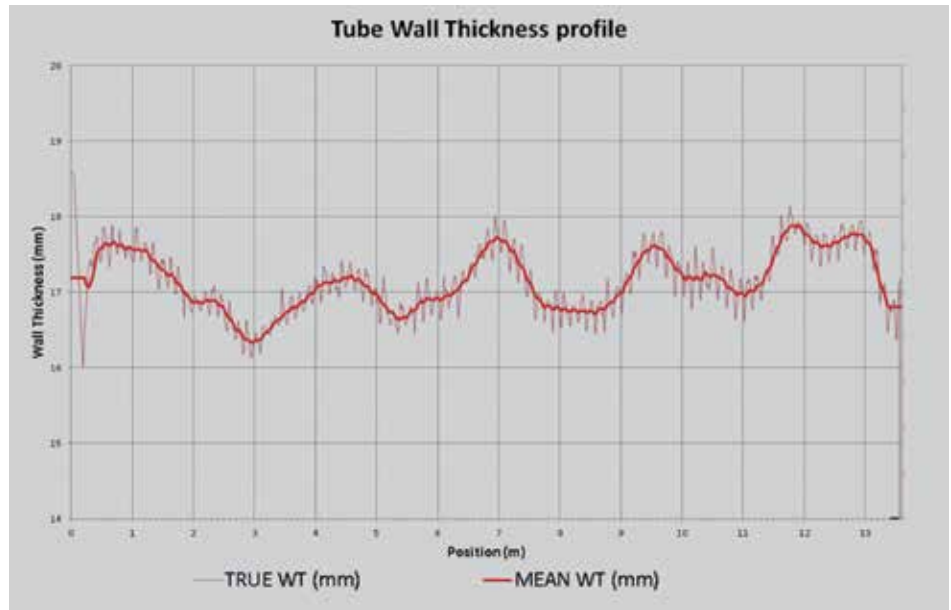


Fig. 2 Typical wall thickness profile

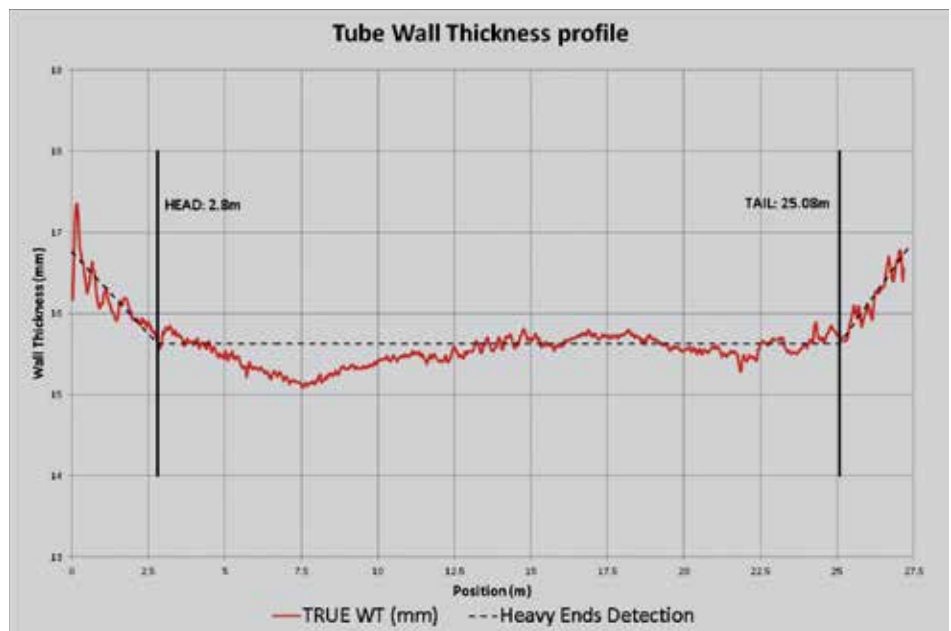


Fig. 3 Profile with heavy ends

eters and directly see the impact on the useable length of tube. Figure 3 shows a typical Lut wall thickness profile obtained from a tube with heavy ends. When modifying a parameter, such as the insertion or extraction speeds, the operator may immediately view the impact of his action on the wall thickness of the tube.

Such profile analysis can be further expended. However, in order to better understand the analysis, it is important to understand the source and type of eccentricities produced in seamless tube manufacturing, and its impact on the wall thickness profiles.

ECCENTRICITY IN SEAMLESS TUBE MANUFACTURING

Low eccentricity is of prime importance for most seamless steel tube application. Eccentricity, for seamless tube manufacturing, is defined as the offset and/or deformation of the inner wall of the tube with respect to the outer wall. It is generally the results of malfunction or of wear in the manufacturing process. It is an unavoidable result of the process that can be, however, managed and controlled. Eccentricity is generally produced at the beginning of the seamless tube manufacturing process. Given its nature and shape, it is usually not possible to correct eccentricity using downstream processes. Therefore, it is of prime importance to detect eccentricity formation as soon as possible, to quickly identify the source of the eccentricity, and to take the proper remedial actions.

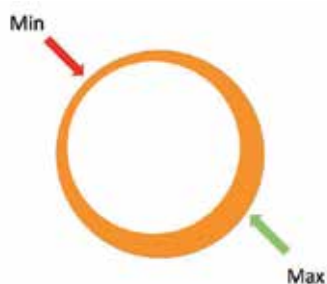


Fig. 4 First order eccentricity

The eccentricity of a tube may be expressed in the term of “order”. The order corresponds to the cycle or frequency at which the wall thickness varies from a minimum value to a maximum value over a full circumference of the tube. For example, if the inner wall of the tube is round but has a slight centering offset with respect to the outer wall, as shown in Figure 4, the measured wall thickness will go from a minimum wall to a maximum value, then back to the initial minimum wall. Hence, for wall thickness measurements over the full circumference, one will see one cycle or first order eccentricity. Such first order eccentricity is often encountered in a piercing press mill. If the piercing mandrel is slightly off-centered, the inner pierced hole will be off-centered, resulting in an eccentric hollow.

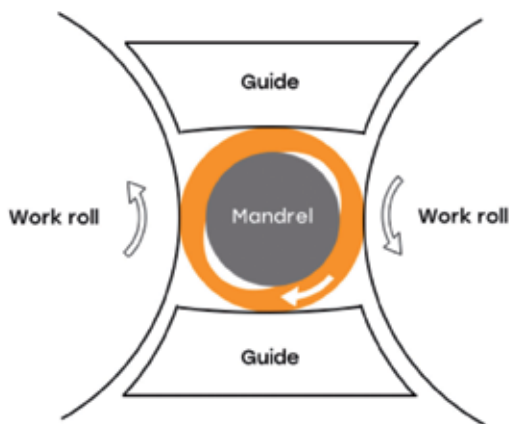


Fig. 5 Second order eccentricity

Other manufacturing process may yield different orders of eccentricity. As shown in Figure 5, a two-roll piercing process applies pressure on the hollow on two-sides, resulting in some bulging. The pierced tube will generally have an elliptic inner shape. Measuring the wall thickness over the full circumference will show two locations with a minimum wall thickness and two locations with a maximum wall thickness. Hence, we will have two cycles or second order eccentricity.

It should be noted that for a rotary piercing process, the eccentricity is “rotating” as a function of the length of the tube. Measuring the wall thickness along a single line will provide a direct observation of the cycle resulting from the inner elliptical shape. For rotary processing mills, a single axis wall thickness profile is sufficient to provides good information of the eccentricities of all orders.

More complex shapes of the inner of seamless tube leads to the formation of eccentricity of higher order. For example, the case of a triangu-

lar shape of the inner wall will results in third order eccentricity. Such inner triangular shape is often encountered with a three-roll processing mill, as shown in Figure 6. As the rolls applies pressure on the tube only along three specific plane, the wall is slightly flattened along these three planes, yield a slightly triangular inner shape.

More generally, it can be shown that a processing stand of a mill with N rolls will produced eccentricity of N order. In addition, as such processing mill are setup with alternating positioned roll sets, 2N order of eccentricity is also observed. Moreover, it can be shown that the contribution of each order of eccentricity essentially is added to provide the overall eccentricity of the tube.

In summary, an order of eccentricity is essentially the number of cycle of going from a minimum wall thickness value to a maximum wall thickness value along the circumference of the steel tube or hollow. The order of eccentricity may help identify the source of the eccentricity. For example, first order eccentricity is generally caused by non-uniform heating of the billet or from a de-centered piercing mandrel. Second order eccentricity is generally caused by two-roll piercing process. More generally, N-order eccentricity and 2N-order eccentricity are generated by alternate stands of N-roll process mill.

Higher order of eccentricity may also be observed by the combination of processing mills, as the eccentricity formation is cumulative. For example, a two-roll piercing process followed by an alternate stand of three-roll process will results in two+six or eight order eccentricity. More generally, any wall thickness profile can be decomposed as a sum of cycles, or eccentricity orders, allowing operator to get more information on the seamless tube manufacturing process.

WALL THICKNESS PROFILE DECOMPOSITION

As described previously, the wall thickness profile contains a rich amount of information, which is not routinely used in seamless tube production. To better understand such capability, let us review an example from a seamless steel mill with a rotary manufacturing process.

Figure 7 shows a wall thickness profile measured online on a hot seamless steel tube with Tecnar’s Lut at the output of a rotary process. The profile was taken along a single line on the top section of the tube. As shown in the figure, several cycles are observed. On further study, one can identify three cycles in the wall thickness profile: a slow cycle, and intermediate cycle and a fast cycle. It is possible to extract the information from each cycle and provide the operator with a clearer picture of the source of eccentricities.



Fig. 6 Third order eccentricity

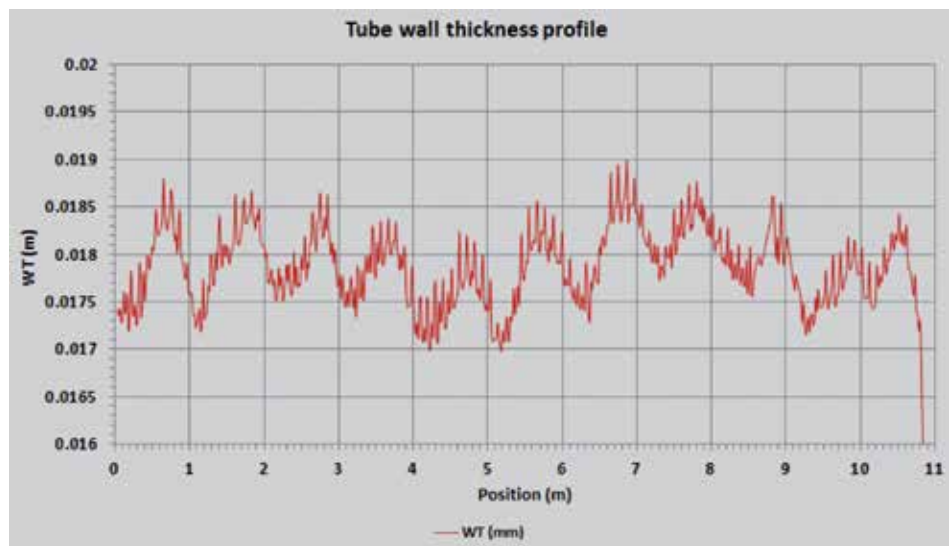
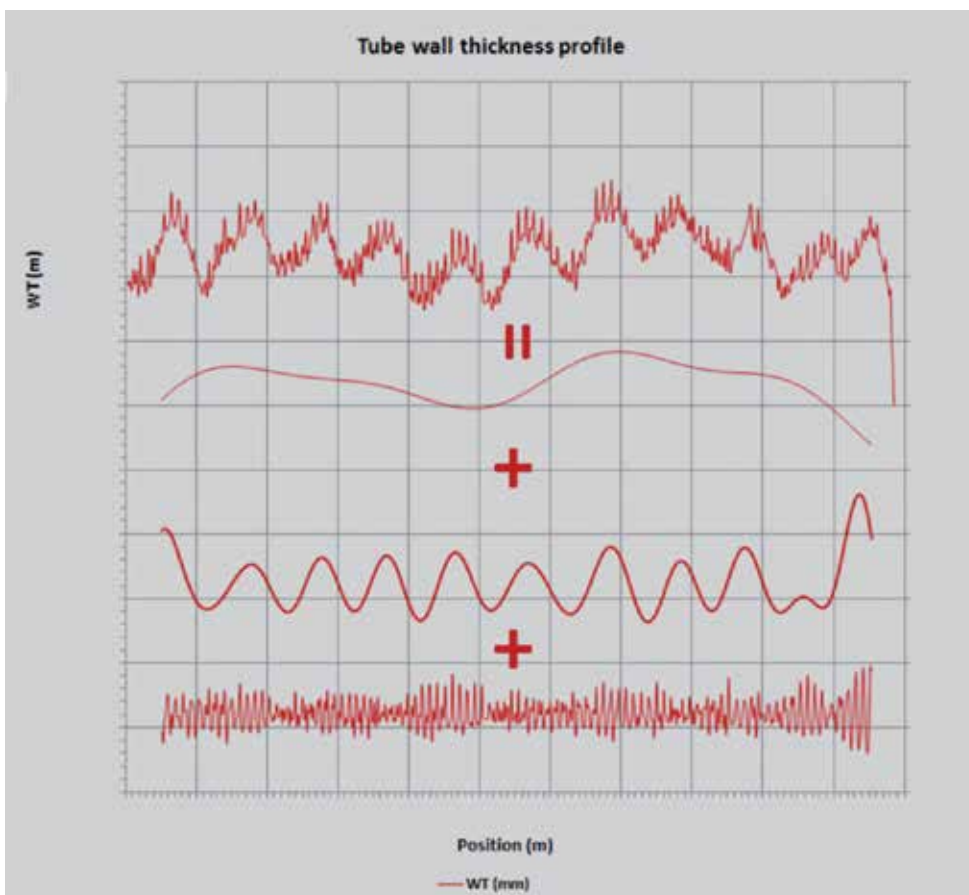


Fig. 7 Raw online wall thickness profile of eccentric tube

By applying a low-pass filter on the thickness profile, one may isolate the slow cycle. From investigation of possible sources, we have found that the origin of the cycle is from non-uniform heating. A non-uniform heating will result in zones which are “softer”, slightly “pulling” the mandrel in the direction of the softer material.

By applying a high-pass filter on the thickness profile, one may isolate the fast cycle. As the fast cycle is almost in-sync with the rotation frequency of the processing mill, one may link to origin of the eccentricity to tools of the process. In the present case shown, the fast cycle has been demonstrated to be linked to plug wear.

Finally, by applying an intermediate band-pass filter on the thickness profile, one may isolate the intermediate cycle. The intermediate cycle is generally mill related, in the sense that it is specific to a mill or plant process. In the case shown, we have been able to link the intermediate eccentricity cycles to a problem with the hollow.



As shown in Figure 8, the full wall thickness profile may be decomposed into three wall thickness profiles, each providing valuable information the operator. By tracking individually each cycle, the operator may react on the heating furnace, on the plug or on the hollow depending on which signal has reached a threshold requiring a remedial action.

The previous example is for a case of a manufacturing process where the tube is rotating. In many modern mills, the manufacturing process does not rotate the tube and eccentricity is observed with a more or less a constant feature throughout the length of the tube. The same analysis as with the previous case may be applied by imposing a rotation to the tube when passing under the wall thickness gauge. However, this may not

Fig. 8 Decomposition of wall thickness profile always be feasible due to limited available space on the plant floor.

An alternative is then to rotate the wall thickness probe. The Lut has a configuration with two probes, one on top and one on the bottom, mounted on a swiveling device providing data acquisition over the

full circumference of the tube. The sensor records the wall thickness data at several location along the length of the tube and at several angle with respect to the circumference of the tube. The data may then be displayed either as function of the length, as in the previous example, or as function of the angle of acquisition. An angular display, as shown in Figure 9, provides information to the operator at specific angles, such as the angle of the roll of a retained mandrel mill. Knowing at which angle wall thickness issues occurs, the operator may determine which roll stands needs to be adjusted.

CONCLUSION

Low eccentricity is of great value for seamless tube manufacturers. Online accurate non-contact wall thickness sensor is a valuable tool to achieved such low eccentricity. The Lut Revolution, with its flexible affordable non-contact ultrasonic technology, provides valued information on wall thickness and eccentricity at all stage of the seamless tube manufacturing process. Real-time display allows operator to verify that production is within tolerance goal, to track production degradation, and to adjust setting in order to achieve production goals.

More advanced signal processing and display enables operators to better address production issues. Understanding the source of eccentricity and its impact on the wall thickness profile enable rapid reaction and increased productivity. By tracking the various eccentricity cycles from wall thickness profile decomposition, production change from tool wear, for example, may be predicted and intervention planned in advance. Maintenance can than move from a reactive mode, where repairs are done when some unfortunate event occurs, to active mode, where maintenance in planned based on data, avoiding down time and extending production time.

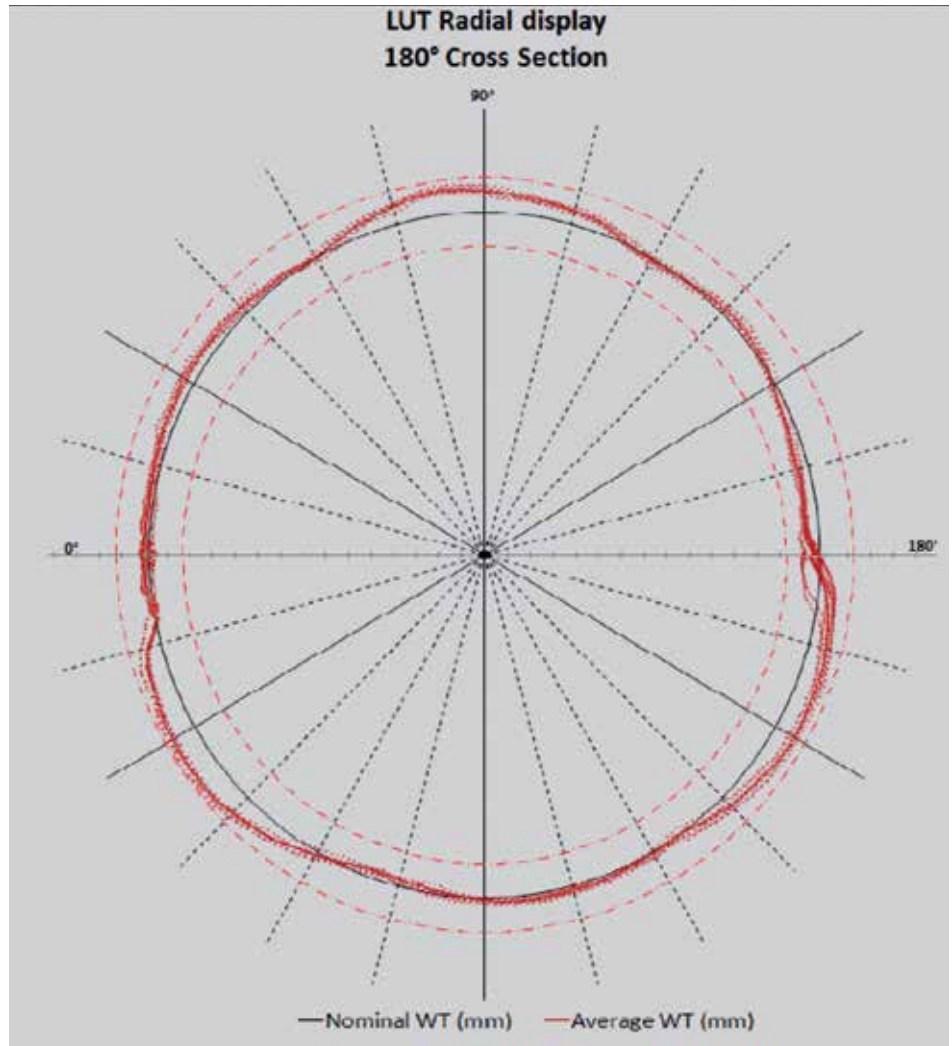


Fig. 9 Radial wall thickness profile

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HMP Group

Mono Tubular Rotor Shafts, produced by Rotary Swaging

In automotive engineering, a fundamental change will take place in the coming years. Digitization, networking with its impact on safety systems, autonomous driving and new drive architectures will lead to the replacement of established components and the demand for new ones. It can be expected that the number of installed components will drop significantly as well as the pro-

portion of steel components. However, the remaining components typically fulfill several functions, are weight-optimized and often have the closest manufacturing tolerances. Cold metal forming will be faced to major challenges.

In the drive architecture, there is much evidence that the electric drive will prevail sooner or later. In the electric motors for this

application, rotor shafts made of steel are used. These components are exposed to high dynamic and thermal stress. Typically for new-generation components, rotor shafts fulfill several functions:

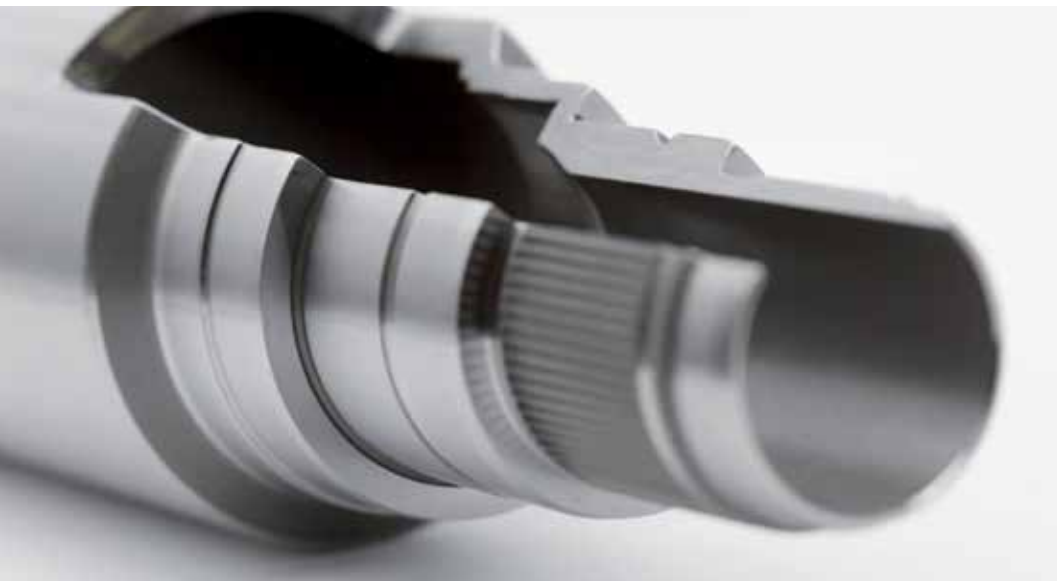
- Torque transmission
- Cooling
- Sensor placement
- Rotor package fit

HMP offers the possibility to realize these shafts weight-optimized. From our point of view, a mono tubular solution is to be favored. Multi-part, assembled solutions are subject to the risk that the joints could adversely affect the component strength.

Starting from a fixed length tube, a preform is first produced by rotary swaging. This is converted into the finished state by soft turning, axial pressforming, heat treatment and hard working.

Rotary Swaging, a powerful forming process

Rotary swaging is an incremental metal forming process for the reduction of cross-sections of bars, tubes and wires. Sets of two, three, four or six dies perform small, high-frequency, simultaneous radial movements (oscillations). With every stroke of the die, a part of the workpiece is formed. Die movement is generated by means of cams. The kinematics are equivalent to those of a planetary gear. This is completely accessible, which makes it easy to carry out any maintenance work.



Advantages:

■ Weight reduction:

Rotary Swaging versus conventional production methods generally leads to weight savings ranging from 30% to 50%.

■ Feasibility of one-piece designs:

The use of conventional forming methods only allows the realization of two- or multi-part designs. These must be welded later which is expensive and risky.

■ Near-Net-Shape-Forming:

Rotary Swaging can produce a diverse range of different forms on both, the exterior and interior of a workpiece. Due to these possibilities material savings can be made and process chains shortened

■ Close manufacturing tolerances:

Cold forming by Rotary Swaging using HMP equipment means: High accuracy! Exterior tolerances usually meet IT 7 level, interior tolerances even IT 6 when special tools are used.

■ High Forming ratios:

Due to its incremental tool motion usually forming ratios > 100% can be realized without annealing if suitable material properties are selected.

Application:

Mono Tubular Rotor Shaft

With the help of Rotary Swaging, it is possible to produce a tubular semi-finished product with variable wall thickness so that in each cross-sectional area enough material is present to take into account the fatigue strength.

The starting material for forming

is a fixed length tube. Seamless or welded tubes can be used. To ensure optimum formability, the tube must be annealed.

With the use of an internal tool, it is possible to adapt the wall thickness in different cross sections to the requirements. In addition, steep-angle transitions, tightly tolerated (IT 6) diameters and almost sharp edges can be created in this way. The objective is to realize the inner shape largely by cold forming. During the subsequent machining, inner shapes produced in this way can be used as a clamping and stop surface.

The forming by rotary swaging takes place depending on the degree of complexity of the shaft in 2 to 4 process steps. The HMP modular system offers several implementation options: either on CNC-controlled single-station machines or with the help of a fully automated production line with several stations.

After cold forming, the shaft can be processed conventionally:

- Turning
- Spline forming (on HMP Axial Forming equipment)
- Heat treatment
- Grinding
- Hard turning

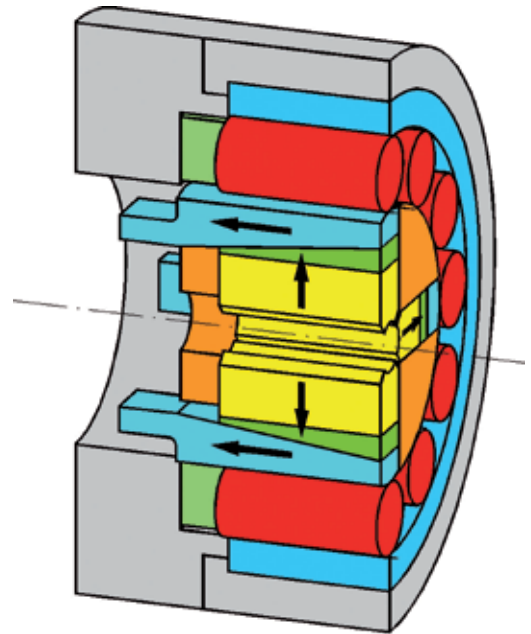
Author:

Dr. Ing. Frank Müller
Managing Director HMP Group

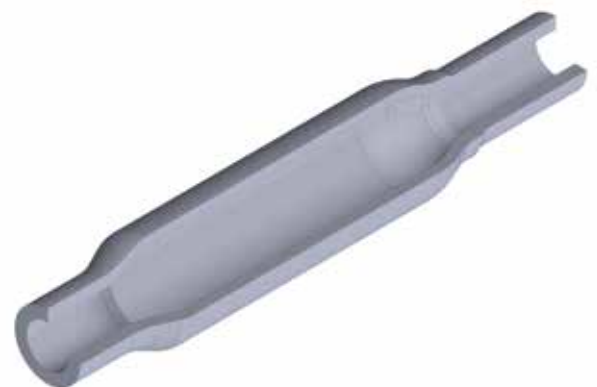
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Preform, realized by cold rotary swaging



Finished form, realized by turning, spline forming, heat treatment and hard working

Welding of Zirconium and its Alloys



Zirconium alloy welded with effective inert gas protection showing no discolouration

Zirconium and its principal alloy zircaloy possess physical properties unmatched by most other metallic materials. The combination of mechanical strength, corrosion resistance and their high temperature stability make them attractive for use in sectors as diverse as biochemical, nuclear, aerospace and petrochemicals.

More specifically, zircalloy is used in the manufacture of pressure vessels and heat exchangers. The alloy has excellent resistance to most organic and inorganic acids, salt solutions, strong alkalis, and some molten salts and these properties makes it suitable for use in pumps where strength coupled with corrosion resistance is mandatory. Zirconium alloys are biocompatible, and therefore can be used for body implants: a Zr-2.5Nb alloy is used in knee and hip implants.

By far the most significant applications however are in nuclear power plant. Zirconium alloys are widely used in the manufacture of fuel rods especially in pressurised water reactors

Preparation for welding

Zirconium is highly sensitive to

contamination by active gases such as oxygen, nitrogen and hydrogen and absorption of these materials can have a significant effect on mechanical, chemical and thermal properties. The joint and filler wire must be carefully and completely cleaned and remain free of all foreign material throughout the welding process. The metal surfaces must be protected using inert gas shielding until the weld metal cools from its 1,835°C melting point to below 315°C.

Electron Beam (EBW) and Gas Tungsten Arc (GTAW) processes are both used for zirconium welding. EBW is undertaken under vacuum so the requirement for environmental protection is not necessary. Welding-grade argon ie 10 parts per million (ppm) other gases (99.999 percent argon) is essential for primary, secondary, and backup shielding during GTAW, as well as for purging. Argon provides excellent arc stability and because it is heavier than air, it blankets the weld and provides protection. Argon and argon/helium mixtures can also be employed for backup shielding and purging, in which helium's low density can effectively purge blind spaces. Gas dew point should be not more than -51°C.

In a high proportion of these application areas fusion welding is an essential requirement but care is necessary to ensure that reproducible weld quality is achieved.

All the conventional welding processes can be used and the basic technical aspects have been understood for many years. It is

however essential to ensure that contamination does not occur—zirconium alloys can be particularly susceptible to cracking and porosity if the welding environment is not properly controlled.

Machining or vigorous stainless steel wire brushing followed by thorough degreasing with a suitable solvent is necessary prior to welding, with the welding taking place within about eight hours to reduce the risk of contamination.

The presence of nitrogen in the shielding gas can give rise to porosity so care must be taken to ensure that the weld area is sufficiently protected and this is particularly relevant in site welding applications. With the gas shielded processes, gas purity and the efficiency of the gas shield needs careful monitoring. Gas hoses should be checked for damage and leaks at regular intervals and, with the GTAW process, as large a ceramic shroud as is available should be used together with a gas lens.

It goes without saying that gas purging of the root is essential when depositing a GTAW root pass. Failure to control purging can result not only in the introduction of weld metal inclusions, but also reduce corrosion resistance if left on exposed surfaces. Post weld cleaning to remove these undesirable contaminants can be time-consuming and expensive.

Controlling Purge Gas Coverage

A wide range of ancillary equipment is available specifically to ensure optimised coverage of the weld zone with inert purge gas.

From simple expandable plugs to fully integrated inflatable devices the products can accommodate pipe sizes from 10 to 2,500 mm.

Expandable Plugs are a popular choice and these are available with nylon, steel and aluminium bodies. Surrounding each body is a flexible seal that can be expanded by applying a radial force through a manually operated wing nut on the shaft.

These mechanical plugs can be used for purging pipework fabrications where a variety of openings are present and where it is easier to purge the complete assembly.

Inflatable Weld Purging Systems have been developed to help speed up the welding process for engineers involved in the fabrication of pipes and tubes.

The revolutionary PurgElite® range, manufactured by Huntingdon Fusion Techniques, is a robust, easy to use, welding ancillary that offers considerable savings in time and inert gas.

Two inflatable dams are connected by a synthetic flexible hose that will not scratch the inside of polished tube or pipe work. The hose is made of a self-sealing intumescent material that resists even hot metal being dropped on it and will not disturb the purge gas flow.

The **QuickPurge®** Family of Inflatable Tube, Pipe and Pipeline Systems have been designed for pipe welding between 6 and 88" (150 and 2,235 mm). Both **PurgElite®** and **QuickPurge®** products are multi-use systems and include high temperature options for pre- and post-weld operations up to 300°C.

Weld Trailing Shields®

Expandable plugs and inflatable

purge systems meet the requirements for protection of the weld root during tube and pipe welding: trailing shields are available for the topside.

They can provide a high level of additional inert gas shielding to supplement that supplied by the basic welding torch. Shields are available to match a wide variety of forms from flat to diameters as small as 25 mm. Both internal and external models are available

Flexible Welding Enclosures®

For component welding, Flexible Enclosures overcome all the disadvantages of glove boxes and vacuum systems but at a fraction of the cost. They occupy considerably less floor space and all parts of the welded component finish bright and shiny with no oxidation or discolouration. Argon gas costs are reduced significantly and cleaning costs are eliminated.

Controlling Purge Gas Quality

Using specialised weld purging equipment does not guarantee defect free welds. Control of the oxygen content of the purge gas is crucial to success and a monitor that measures residual oxygen content reliably and accurately at the low levels considered is necessary when welding zirconium alloys.

These instruments are capable of measuring oxygen content accurately as low as 10 ppm - more than adequate to satisfy the residual oxygen recommended for zirconium alloy welding.

REFERENCES

Developments in End Closure Welding Technology for Zircaloy Clad Fuel Elements. Amota I and Carena G, Energia Nucleari 17 (1970)

Welding zirconium and zirconium alloys



The most efficient method of ensuring high quality inert gas coverage is to use flexible enclosures. They are available in sizes approaching 30 cubic metres with residual oxygen content as low as 10 parts per million.

Sutherland R, Tube and Pipe Journal, September 2016

FURTHER INFORMATION

Welding of zirconium alloys Komuro K, Welding International, 1994 (2)

Guide for the fusion welding of zirconium and zirconium alloys AWS G2.5/G2.5M: 2012, January 2012

Huntingdon Fusion Techniques Ltd in the UK can provide the following detailed information on request: Technical Notes; Expandable Plugs, PurgElite® Systems, Trailing Shields, QuickPurge® Systems, Flexible Welding Enclosures®, Weld Purge Monitors®.

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Pöppelmann GmbH & Co. KG

PÖPPELMANN blue® – Recycling of protective Elements



PÖPPELMANN blue®: Recycling of KAPSTO® protective elements as part of the company-wide initiative for improved sustainability

Closed material loop instead of disposing KAPSTO® protective caps and plugs: PÖPPELMANN blue® initiative aims at reutilisation through recycling

According to the European Commission, Europeans produce 25 million tonnes of plastic waste each year. In view of climate change, pollution, population growth and resource dependence, environmental and climate protection have become a global challenge. According to a joint study by the World Economic Forum (WEF) and the Ellen MacArthur Foundation, only 14 percent of the total global tonnage of all plastic packaging is currently being reused or recycled. However, experts believe that current technologies could help raise this quota to 70 percent through concerted action by the industry. The EU Commission has just laid down a European plastics strategy, which also

Recycling instead of disposal: In future, protective caps and plugs will be returned to Pöppelmann KAPSTO® for reprocessing after removal

foresees the reduction of plastic waste through increased recycling and higher reusability as the only viable long-term solution. The path to improved sustainability is therefore a much discussed and important topic, especially in the plastics industry.

Pöppelmann GmbH & Co. KG is further extending its focus to this topic through the company-wide PÖPPELMANN blue® initiative. The company from Lohne (Lower-Saxony) has become one of the leading manufacturers in the plastics processing industry. Pöppelmann can rely on more than 2,000 employees, five production sites and four different business areas to supply its products to a wide variety of sectors in more than 90 countries – from the automotive industry, commercial horticulture, machine and equipment engineering, through the food, pharmaceutical and cosmetic industries,

right through to the medical engineering sector.

Committed to plastics production

“As an industrial company in the field of plastics processing, we are particularly committed to making our products and processes as environmentally friendly as possible. This starts in the early development stage through an analysis of the ecological aspects, and extends throughout the life cycle of our products. Our stated goal is to reconcile economic action with ecological thinking”, explains Torsten Ratzmann, CEO of the Pöppelmann Group.

Therefore it goes without saying that the use of recycled materials is one of the core competences of the corporate group: Pöppelmann has been using recycled material in its various divisions for around 20 years. These include, for instance, post-industrial recycled materials – i.e. plastic products that are returned from various production processes and then reprocessed. In the Pöppelmann TEKU® division – the company’s horticultural branch – the proportion of recycled materials used in the various plant pots is already more than 80 percent. Recycled materials are also used at Pöppelmann KAPSTO® and K-TECH® for various industrial sectors.

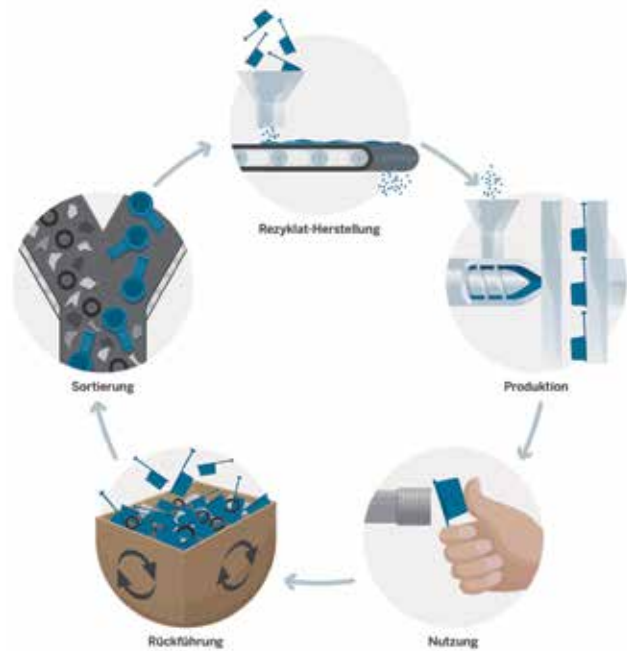
The use of recycled materials is therefore a key component of the company’s sustainability strategy. The Pöppelmann Group is now taking things even one step further: A new strategic initia-

tive under the motto PÖPPELMANN blue® bundles activities throughout the company that aim to promote a recycling economy. "Because the transition from a linear economy to a circular one is ecologically necessary. With PÖPPELMANN blue®, we do our best to achieve a closed material loop in which the plastic used comes from the exact same value-added stage. This means, for instance, that a product made by us ends up in a recycling bin after use, it then goes through reprocessing, and finally becomes a new product made entirely from recycled material", explains Matthias Lesch, Head of Marketing and Innovation.

KAPSTO® protective caps and plugs – from a single-use part to a new product

The Pöppelmann KAPSTO® division

manufactures injection-moulded plastic protective elements for various applications. The KAPSTO® product family includes protective plugs and caps, grips and screw caps as well as custom-made components for optimum protection of external threads, bolts, cables, etc. during manufacturing, storage and transport. For instance, they protect inner and outer contours from mechanical damage and prevent the penetration of dirt into sensitive, safety-relevant and function-critical components. The KAPSTO® protective elements are produced for a wide variety of target markets including, for instance, manufacturers and suppliers in the automotive, mechanical engineering, construction, electronics, hydraulics, aerospace, pneumatics and measurement and control tech-



Closed material loop: A protective element is transformed into a new one

A collage of images showcasing Bültmann products and manufacturing. The top row features various metal components: a polished metal pipe, a grid of blue and yellow spheres, a coiled orange cable, a complex metal assembly, a bundle of yellow pipes, and several vertical metal tubes. Below this, four smaller images show industrial machinery: a blue machine with the Bültmann logo and 'Partners in know-how' text, a worker in a blue uniform operating a large white machine, a yellow and green machine processing metal rods, and a blue machine with a red component.

Bültmann

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PÖPPELMANN blue® initiative: The Pöppelmann KAPSTO® division is open for partnerships and concrete projects for better sustainability

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nology sectors. “Our products provide temporary protection in most applications. When they are no longer needed, they are taken off and finally disposed of. Such disposable products or packaging items are of particular interest for the topic of recycling”, says Thorsten Koldehoff, Sales Manager at Pöppelmann KAPSTO®. This division faces various challenges in the quest for ways of achieving a closed material cycle.

For this to happen, the products fed into it must be recyclable. This means that up to 100 percent of the recycled material used must be subsequently 100 percent recyclable. To tackle this, the KAPSTO® division resorts to various options. “Today, recycled plastics are often still mixed with new material in the recycling process. We are working on various options to ensure a closed cycle of plastics”, says Thorsten Koldehoff. One way is to use post-industrial regrind (PIR). This includes recycled materials based on plastic parts used in industrial sectors. These plastic parts can then be processed by compounding them to regranulate. Another way is to use regrinds. Even in this case, plastic parts are collected from the industry, ground by specialist companies, and sorted according to type and purity. Professional preparation creates a clean secondary plastic with identical properties. Finally, there is also the possibility of using post-consumer regrind (PCR). This could be material such as the one obtained from the collection of recyclable products by the Grüne Punkt – Duales System Deutschland GmbH (DSD). This waste is selected, sorted according to type and purity, and also reprocessed. One

can also mix material from all these different sources. “We deal with all conceivable variants. We make our selection on a per-case basis, depending on the specific requirements of our users”, explains Thorsten Koldehoff.

The first projects are already underway at Pöppelmann KAPSTO®, for instance with a long-standing KAPSTO® customer who uses the plastic elements to protect hydraulic lines against contamination before they are installed in the production line. The protective caps are removed just before assembling the lines. Instead of ending up in the landfill, in future they will be collected and returned to Pöppelmann KAPSTO®. Since the plastic products come exclusively from the hydraulic assembly, they are barely contaminated and can be easily processed into recycled material. “Products from other application areas, which, for instance, could have large amounts of paint residues, complicate the recycling process if it is meant to produce an equivalent plastic for the same application. Therefore, this application area is ideally suited for one of our starter projects as part of our PÖPPELMANN blue® initiative”, points out happily Thorsten Koldehoff.

Taking on a globally leading position

Pöppelmann is of the view that the work on many different projects falling under the PÖPPELMANN blue® initiative should be taken further. “We are convinced that solutions can only be found if we work together. That is why we want to build new partnerships with other companies that are committed to sustainability.

Intensive engagement with this topic holds a great opportunity for the European industry, and especially the plastics industry, to take global leadership in new technologies and materials. The company-wide PÖPPELMANN blue® initiative enables us take on this challenge. At the KAPSTO® division, we are launching very promising projects and are convinced that even more is possible. The industry can look forward with anticipation”, concludes Thorsten Koldehoff.



Thorsten Koldehoff, Sales Manager at Pöppelmann KAPSTO®: “Disposable items, such as our products, are of particular interest for the topic of recycling.”

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Coming Soon!

Following 33 years of industrial experience, **Azak Tool Technologies Inc.** is preparing to gain a place in HSS circular saw blade market with its own processes.

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SMS group GmbH

Wafer-thin layers and a great future – Additive Manufacturing at SMS group

The breakthrough of 3D printing for home use, predicted in 2010, is yet to come. Nevertheless, the revolution is taking place - not as predicted at the homes, but in industry. And it is happening with breathtaking speed. More and more sectors of industry have been recognizing and making use of the advantages of 3D printing and Additive Manufacturing, last but not least the plant and mechanical engineering industry. For many years, SMS group has been very active in the field of Additive Manufacturing. A young and dedicated research and development team is advancing and promoting this innovative technology within the company. The team members do not limit their activities to investigating which new and optimized components could possibly be produced by Additive Manufacturing (AM). They rather dedicate a great deal of their activities to introducing a new way of thinking in the design and engineering departments.

Agile project team for the promotion of Additive Manufacturing

Norbert Gober, initiator of SMS group's AM team: "The AM project team has been given a lot of freedom and lean structures to allow us to test out new approaches, take a critical look at traditional methods and be able to act flexibly and agilely. Since shortly, we have an own powder bed 3D printer for metal printing, which has been provided by our cooperation partner Additive Industries. With this printer, we will in future be able to implement new concepts right here, in-house."

The full range of AM technologies at a glance

As a manufacturer of plants and machinery for the steel and NF-metals industry, SMS group focuses on components made of metallic materials because the machines and equipment will be subjected to

extremely high loads during operation. The performance potential of the materials are investigated and tested under field conditions. Besides metals, also alternative materials, such as plastics and ceramics, are examined. Additive Manufacturing means producing an object based on digital 3D design data by adding material layer by layer.

The number of available AM techniques is great. However, for the time being two main techniques are commonly used for plant and heavy machinery applications:

selective laser melting in a powder bed and the laser melting deposition process. In selective laser melting, layer by layer of a high-purity



Additively manufactured roll cooling header

homogeneous metal powder is selectively, i.e. at defined positions, melted by a laser. In this way, the component is gradually built up. With the powder bed technique it is possible to produce components of complex and unprecedented structures, which would not be feasible by conventional processes.

In laser metal deposition, metallic powder or wire is fed via nozzles and melted by lasers at defined spots. The unit that accommodates the laser and the nozzle may be actuated by a robot. Laser metal deposition achieves high build-up rates, but it is limited in terms of fineness. For plastics-based components, the selective laser sintering (SLS) process is available. This technique is very similar to the powder bed process using metals, the only basic difference being that it uses a special powder of plastics material melted by a laser.

New way of thinking required

Robert Banse, member of the AM R&D Project Team of SMS group: “We adopt an entirely new approach to component designing. We are in no way restricted by any manufacturing constraints. We do not have to consider the geometry of the input stock, e.g. a forging blank, or the specific requirements posed by machining processes such as milling or drilling. Therefore we can start out from the function the component is going to perform. We adopt a creative technological approach to designing. In other words: We develop the perfect shape for the function at hand ready to be produced in the 3D powder bed printer. We have stopped thinking in terms of rectangular bores because in AM flow-optimized channels have become the most natural thing in the world.”

Innovative spray heads for forging plants

The advantages of Additive Manufacturing can be illustrated by way of the example of a spray head for cooling the dies in a forging press. Sarah Hornickel, who is also a member of the project team, explains: “The original spray head was a solid and heavy part. We redesigned the part in close cooperation with the responsible technical department and our simulation specialists. Additive Manufacturing allows us to design flow-optimized channels, do away with any superfluous and heavy material and arrange the spray nozzles in such a way that the most intensive cooling takes place exactly where the highest temperatures occur in the die. With the thus produced lighter-weight and individualized component, die cooling takes less time and becomes more efficient – two aspects which will improve the productivity of our customers’ operations.”

Development within a strong network

Sarah Hornickel, Nina Uppenkamp and Robert Banse form the core AM team. They work with other supporters of AM and the various SMS group departments. Robert Banse: “I completed an apprenticeship and a dual study program at SMS group. During my studies, I specialized in Additive Manufacturing, a topic that fascinates me also outside my job. Within the SMS group community, we are very well networked and we have established a dedicated service network. These networks are just as important for the kick-off of new projects as technological know-how.”



Conventionally and additively manufactured roll cooling headers



The mission: Informing and inspiring colleagues

A further task of the project team is to communicate the know-how, and the potential and benefits of AM within the group. Sarah Hor-nickel: "We organize design workshop, also for external companies, are in direct contact with the design departments and do not miss out on any opportunity to share information about Additive Manufacturing with our colleagues so that they can see the great potential it provides. Only colleagues who are convinced about Additive Manufacturing will make consistent use of the advantages of AM in their daily work. We have tried out new forms of spreading the word: We organize information rounds with our colleagues and have set up information booths at the canteens at the SMS group locations in Germany. Our booth was a great success, with large groups of people stopping by to get first-hand information about this fascinating new technology." Nina Uppenkamp adds: "It is important to demonstrate – both within and outside the company – that SMS group generates added value for its customers by making active use of this future-oriented technology. This is why we work closely and as a trusted partner with our design departments and with our customers. The plant operators are very interested in additively manufactured components and the potential they provide to optimize their production processes.

Less weight, higher speed and integrated functions

The project team has already implemented a great number of innovative solutions, which impressively demonstrate what advantages Additive Manufacturing processes provide. Their most important benefits include: significant weight reduction of dynamically actuated components, functional features are directly manufactured into the part during the 3D printing process, improvement of energy efficiency as a result of optimized flow patterns and minimized weight, dramatically shortened delivery periods and the possibility to produce virtually anywhere in the world.

Nina Uppenkamp describes a project which has benefited from the full range of advantages provided by Additive Manufacturing: "In a copper wire rod mill, annular gap nozzles are used for wire cooling and water removal. The conventional component consisted of several parts and the air gap adjustment required the use of a shim. Setting up and properly adjusting the component involved a great effort by our customer. Our task was twofold: First, the component design was to be simplified and, second, the adjustment was to be accomplishable without the aid of a shim. We produced a nozzle by AM which requires only 35 millimeters of installation space – versus the previous 65 millimeters, weighs only 0.85 instead of 2.5 kilograms and is of mono-



Installation of the nozzle at BIRLA COPPER



Individual nozzles

lithic design. The nozzle no longer consists of six parts. It is now one piece which does not require preassembly or adjustment of the nozzle prior to its installation in the plant. The new nozzles are already successfully in operation at BIRLA COPPER in India. They are less noisy than the previous ones and meet or even exceed all performance specifications. As we have manufactured the nozzles from a high-strength, wear-resistant material, they can remain in service much longer than their predecessors.”

Applications along the process chain from the meltshop to the rolling mill

Also the other projects implemented so far have provided extremely promising results: A new roll cooling header for wire rod mills featuring a contour-adapted design with integrated nozzles has been performing excellently. By using Alumide, a blend of aluminum powder and polyamide powder, we have made the new component lighter and cheaper than the conventional solution. An example from BOF steel-making: We have been able to reduce the size of our SIS injectors used in steel melting by 60 percent. The injectors now come in one piece. In the past they consisted of eight individual parts. Tube welding plants made by SMS group will in future be able to produce tubes with diameters down to 14 inches or even less. Thanks to a hybrid design including additive and conventional manufacturing, the oil rings for the expanders can be made smaller – without compromising their performance capacity. And the Technical Service of SMS group benefits from the lower weight and dramatically reduced delivery times of connecting frames for feeding systems in extrusion plants.

A development characterized by dramatic dynamism

The projects mentioned above show where Additive Manufacturing is heading. Norbert Gober strongly believes that the development will still pick up momentum in the near future: “There are several driving forces. At the universities, future design engineers can nowadays avail themselves of printers to print the parts they design and immediately examine the result in the form of a real component. The growing demand for AM components will in turn spur the development in printer technology. We see several new printer technologies pop up every year. Maybe, another energy source will soon appear on the scene in addition to the laser. The young people coming from the universities will bring with them new ideas, concepts and methods that will change attitudes and strategies in the companies. Nothing is backwards oriented, everything is moving forward at full vigor. I believe that conventional manufacturing will become increasingly open to this trend and that there will be many more links between the two manufacturing methods. First hybrid machines combining LMD and milling are already available on the market. I am pleased to see that SMS group has already made great achievements in this challenging technological field and that it is well positioned for the future.”

Technology Press Day: May 8, 2018, SMS group GmbH. Nina Uppenkamp, Robert Banse, Sarah Hornickel - Manager Additive Manufacturing



Section through a SIS injector



Hybrid design of the oil ring

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The Major Challenges of Inspecting Small Diameter UltraThin Wall Tubing with the Ultrasonic Testing Method

Abstract: For the purposes of this paper and presentation, small diameter, ultra-thin wall tubing will be considered as diameters less than 0.5 inch (12 mm) with wall thicknesses less than 40/1000 inch (0.5 mm). Ultrasonic inspection of this category of tubing requires very stable and precise mechanics and higher than usual ultrasonic frequencies, especially to evaluate wall thickness. This paper discusses very important points to look at as you decide on the appropriate ultrasonic system supplier. Some currently available electronic techniques will also be presented as valuable system assets to exist in the systems offered by the potential suppliers. The presented electronic techniques have been evaluated, as well as applied to difficult wall thickness tubular products

Part 2 Review

In Part 2 of this article, we discussed the second most critical element in the ultrasonic tube inspection system, the transducer. After insuring that the tube is centered with respect to the transducers inside the rotary system, we stated that the transducer beam parameters must be optimized to provide acceptable results during the tube inspection. To provide this insurance, we established that we needed to generate higher transducer operating frequencies to measure such ultra-thin walls. The shorter wavelengths of these high frequencies will allow us to more easily distinguish the very short wall thickness distances (10 to 40 mils) found in ultra-thin wall tubing.

Transducer Parameters Requiring Improvement

Using a transducer frequency with a wavelength that is less than 3/4 of the wall thickness, the less the better, helps the instrumentation discriminate the short distances between the wall echo multiples. Referring to Figure 1., the upper sine wave burst has a wavelength equal to the wall thickness. This wavelength makes it difficult to discriminate the frequency from the thickness echoes. Whereas, at the bottom of the same figure, the shorter wavelength, higher frequency, single cycle sine burst pulse easily shows separation of the back wall echo from the front wall echo. This separation simplifies discrimination of the front and back surface echoes enabling the electronic system to make the required precise wall thickness measurements.

In addition, using highly damped, broad band transducers that produce single cycle transmission pulses further assists with better wall echo discrimination. The improved discrimination decreases changeover times, providing a major source of cost reduction.

Broad band transducers whose center resonant frequencies give this desired wavelength must be used. As thinner wall measurements are encountered, higher transducer frequencies are required. Frequently,

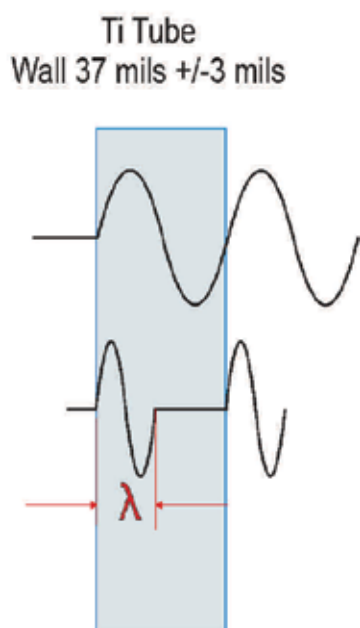


Fig. 1

off the shelf center frequencies are not close enough to the desired measurement frequency. However, frequencies that lie within the range above the available center frequency, at -3 to -6 dB down from the center frequency, could be used if these frequencies could be excited electronically.

Figure 2., shows a diagram of a plot of the frequency response of a broad band transducer with its center frequency F_c at 17.5 MHz. However, we would like to use a higher frequency, perhaps at 20 MHz. This point is shown in the diagram as $F_{Desired}$. A small circle surrounds the intersection point at the energy level for the desired frequency. The intersection point is above the -3dB energy level. Therefore, at the desired frequency, we will still can transmit more then 70% of the energy found at the 20MHz center frequency.

When a spike wave or square wave electronic pulser (Figure 3.) is used, the transmitted output sound energy will occur at natural resonant frequency F_c of the transducer, 17.5MHz. To excite the transducer to operate at the desired frequency of 20 MHz, we need to excite this transducer with an excitation sinusoidal frequency burst at a frequency of 20MHz. This can be done by using an electronic pulser that can drive the transducer with a selected output of 20MHz burst frequency. In Figure 4., the top trace shows a 4 cycle burst from a burst pulser. Although the trace shows a square wave burst, the broad band transducer will respond by generating the output sound frequency as a fundamental sine wave burst of 20MHz. This is due to the principle that the fundamental of a Fourier series component of a square wave will be a sine wave at the same base frequency as the square wave.

Optimizing Transducer Parameters with an Electronic System

The following list points out the two critical measurement areas of concern that we might wish to improve:

- Dimensional transducer parameters
- Flaw detection transducer parameters

In this article, we will concentrate on the dimensional transducer parameters. Although, the other dimensional measurements such as OD, ID, ECC, and Ovality are very important, meeting the transducer requirements for wall measurements will simultaneously cover the requirements for the remaining dimensional measurements. Flaw detection parameters typically have not caused much difficulty during setup times, when applying 12 or 15 MHz line focused angle beam transducers. The shear wave wavelengths, 0.0083 to 0.0067 inch, are acceptable for relatively small notches 0.25 in (6.35 mm) long by 10% of wall depth

Frequency and Wavelength

If you purchase a broadband transducer with a center frequency having a wavelength that is less than 3/4 of the thickness that you wish to measure, the only electronic assistance that will be required is a pulser with a fast enough rise time and a receiver with adequate bandwidth. For the tube specimen examined for the tests reviewed in this article,

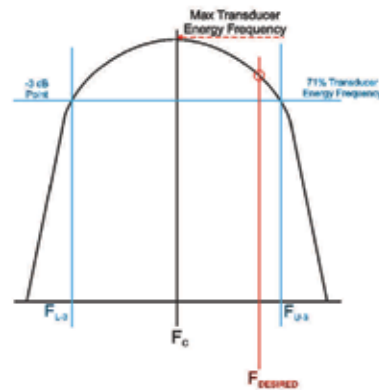


Fig. 2

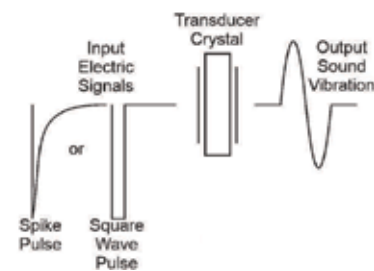


Fig. 3



Fig. 4



Fig. 5

we used a titanium tube 0.375 inch (9.5 mm) with a nominal wall measurement of 0.019 inch (0.048 mm). The UT instrumentation that we used was a Pico Pulser with a spike/square wave pulse rise time of less than 10 nanoseconds and a receiver bandwidth of at least 30 MHz. Figure 5. shows a photo of the Pico Pulser/Receiver. The line focused transducer that we used was broadband with a 20MHz center frequency. Since the wavelength of 20MHz is 0.012 inch, it is already less than 3/4 of a wall thickness of 0.019 inch (0.048 mm). Therefore using the Pico Pulser's square wave pulser was more than an adequate choice for this wall measurement.



Fig. 6

To obtain the measurement results, we first made a test fixture that insures the centering and stability as we discussed in Part 1 of this Series of 3 Articles in the "ITAtube Journal." Figure 6. shows the fixture was made, with a water chamber that mechanically centers three diameters of titanium tubing: 1/4", 3/8", and 1/2" (6.35 mm, 9.53 mm, & 12.7 mm). To fix each tube diameter to the center of the chamber, a chord grip nut containing a centering bushing can be tightened or loosened to constrain the tube to the chamber center. The transducer is placed in the top cord grip nut where it can be adjusted to achieve the desired water path then fixed by tightening the cord grip nut. The entire assembly, Figure 7., is then placed in a small immersion tank where water is circulated through the fixture to surround the tube continuously with water. The water provides the necessary water path that couples the sound beam to the tube wall being measured.

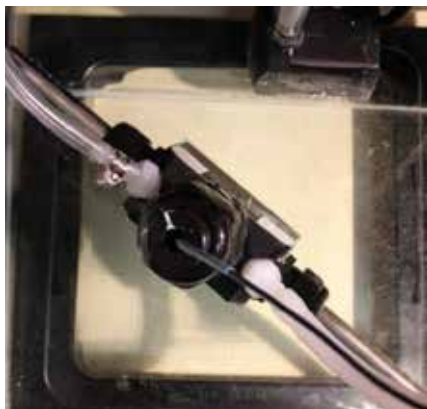


Fig. 7

The electronic instrumentation used was the Pico Pulser/Receiver and an oscilloscope interconnected as shown in Figure 8. The Pico Pulser is a purchased compact pulser/ receiver preamp that enables you to send ultrasonic echo signals directly to a very sensitive oscilloscope with which you are able to view detailed echo information.

The oscilloscope trace in Figure 9. shows echo pairs, indicated by the red double arrow lines. There are 4pairs of echo multiples. The separation of these echoes will enable the measurement to be made easily by ultrasonic wall thickness evaluation electronics. The time base at the bottom of the screen indicates that each major division of the graticule represents 100 nanoseconds. The distinct broad separations between the sharp negative going vertical pulses are approximately 150 nanoseconds. This represents a round trip time for 0.018 inch (0.46 mm).

$$2(WT) = V_{Ti} \times t_{RTT}$$

WT =Wall Thickness

V_{Ti} =Velocity of Sound in Titanium

t_{RTT} = Round Trip Time in the Wall Thickness

$$2(WT) = 2.4 \times 10^5 \text{ IPS} \times 150 \times 10^{-9} \text{ Seconds} =$$

$$2(WT) = 0.036 \text{ inch}$$

$$WT = \frac{0.036 \text{ inch}}{2} = 0.018 \text{ inch}$$

This wall measurement represents a reading within 0.001 inch (0.025 mm) for this nominal 0.019 inch (0.048 mm) wall tube. The main concern using this approach is to select a transducer with a much shorter wavelength than the thickness of the tube wall.

What if you are not able to find a 20 MHz center frequency transducer?

We discussed the idea of a burst pulse earlier. Consider that we have a transducer that is broadband with center frequency a center frequency that 16 MHz. Yet we would like to work with frequency at 20 MHz. Looking at the broadband characteristics, we note that it shows a 20MHz frequency at a point between center frequency 16MHz and the upper -3dB down frequency position. With a pulser that has an adjustable 20MHz burst frequency we can force the transducer to operate at this 20MHz position on the curve. This would enable us to operate a 16MHz at the same frequency as the earlier transducer with its center frequency at 20MHz using the simple spike pulser. Because, the burst pulser that we have cannot provide a burst frequency above 10MHz, we are unable to demonstrate the affects of burst frequency shifting away from the center frequency to a higher point , above the -3 dB on the transducer's broad band spectral curve.

However, if you look back to the early 1970s, you will find that a company called Nutronik GmbH produced and sold ultrasonic resonant frequency instrumentation. Instead of using a burst frequency, they swept the frequencies, from 7.5 MHz to 15MHz, across the bandwidth of broadband transducers. Whenever the wavelength ($\lambda/2$) of the sweeping frequency matched the thickness it produced a spike at the calibrated thickness for the frequency. This was the forerunner to the burst pulsers of today. So using high frequency wavelengths for ultra-thin wall is not actually a new technique. Instead it is merely a new resurrection of something old with new electronic techniques.

A Final Comment:

The tools to perform ultra-thin wall measurements using ultrasonic methods are available. Nevertheless if you are looking for a system to perform these measurements on super thin wall, small diameter tubing, you need to be aware of the need for working with high frequencies in the range of 17.5 MHz to 22.0 MHz if you expect to avoid long drawn out changeover times.

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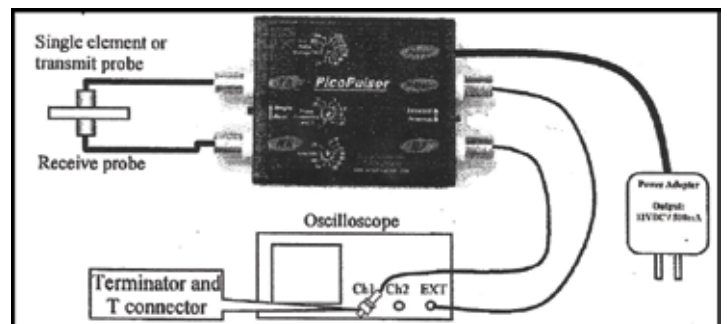


Fig. 8

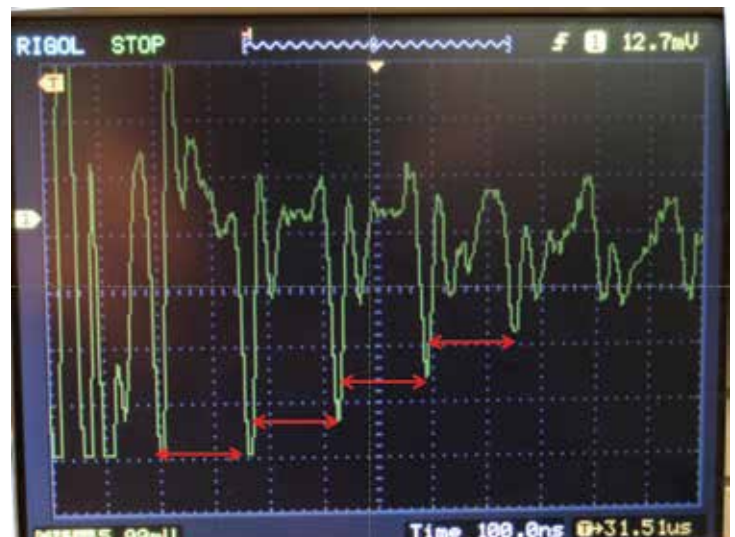


Fig. 9

Messe Düsseldorf GmbH

Fire safe valves withstand explosions and blazes – Demand is growing.



Danger lurks everywhere. Fires are a daily risk in the oil and gas industry. Valves must cope with extremes in the case of emergency. Components thus need to be fire safe if they are to withstand threatening situations. Everything else would be playing with fire. No wonder demand is increasing for fire safe valves.

Losses can be devastating in a case of emergency; therefore, safety is just as high a priority for valves as high quality, and a long life cycle. "Fire safe valves are mainly used in the oil and gas industry, as risk of fire is high," explains product manager Stefan Keller, AS Schneider. Fire hazards lurk in each step of the process – ranging from oil and gas production to transport, as well as in refineries and storage. The consequences could "understandably be substantial," emphasises Keller.

Danger for man and material

Explosions in refineries or on oil rigs are a threat to man and mate-

rial. A defective blowout preventer with safety valves played a major role in the devastating catastrophe on the oil rig "Deepwater Horizon", in the Gulf of Mexico. The valves malfunctioned, 780 million litres of crude oil flowed uncontrolled into the ocean, and caused several billion dollars in damages. Even more, eleven men died and 600,000 birds perished.

Other sectors also place their trust in fire safe valves. Petrochemistry, for instance, where "filling processes of inflammable substances in tank farms" are usual, explains Vetec Ventiltechnik. In a critical situation, fire safe valves have to stand the test in real conditions, particularly in view of having to handle fast filling times. Vetec developed a rotary plug valve with a double excentric plug design, which ensures that there is no contact between plug and seat while rotating. No particles can adhere in between. "The housing is basically free of dead space, so no troublesome soot deposits can occur," states Vetec.

Operating with highly flammable materials

Fire safe valves also provide the chemical industry with much needed security. Ethylene oxide becomes highly flammable in contact with oxygen, reports Vetec. In an emergency, fire safe valves go through hell to keep the plant safe. Valves should not only have a fire safe design, but also be certified as fire safe. Here, fire safe testing facilities come into play.

Specialised testing facilities leave nothing to chance and put valves through their paces. Take Amtec, for example. The company developed a new fire safe test rig to test valves according to DIN EN ISO 10497, API 607, API 6FA or API 6FB. "With this test rig, all important type acceptance tests for fire resistance can be conducted," says Manfred Schaaf, Amtec Advanced Measurement. Not only that: if needed, client-defined testing procedures can also be performed. This allows individual applications to be tested.

Automated ignition process

Amtec's test rig allows automated test procedures without manual intervention during firing and pressurising – for instance for regulating temperature and pressure. Ignition is automated, as well as the burner shutdown after the end of the firing period. Valve manufacturers are promised an improved repeat accuracy, a lower variation of temperature curves between tests and full compliance with norms. User-defined procedures are configured. And all of this with an increased level of safety, states Amtec: housing and burning chamber with window are closed, the flame is controlled, a pressure relief valve adds a further level of security. The housing temperature is controlled, including the automatic cooling system. The test rig is equipped with an emergency shut off function, turning off the burner and pump.

Under fire for 30 minutes

The stresses a valve must with-

stand in the test rig also depend on the test standard. There are important main criteria: the valve must be able to resist interior pressure – depending on norm, valve size and type. Water is used as a medium. Firing lasts 30 minutes, the flame reaches a temperature of up to 1000 °C, and the housing temperature 600 °C. After the firing period, water is used to cool down the valve to 100 °C, over a period of ten minutes. Depending on norm, cooling can also take place using air. It is essential for the “leakage rate to comply with the specific norm,” emphasises Manfred Schaaf, Amtec. Packaging, housing seal and seat are viewed as critical. If a valve fulfils the leakage criteria set in a norm, the product receives a certificate: tested fire safe!

Enhanced test rigs

Safety is too important for things to stagnate. “Due to changing testing requirements the test rigs have to be modified again and again,” states Manfred Schaaf. Investments are always required: just recently, the company put a test rig for cryogenic temperature applications into operation.



Amtec is continuously expanding in the lucrative testing facilities field. Meanwhile, various testing facilities are available for testing seals, valves and stuffing boxes. Development of the fire safe test rig was, by the way, realised within a project supported by the Federal Ministry of Economics. A project with propelling Germany forwards.

Various testing institutes in Europe already had individual test rigs, but the most important institute for fire safe certifications has so far been a testing laboratory in the USA. “With the test rig we developed type approval tests can now also be conducted here in Germany,” says Manfred Schaaf. “Valve manufacturers, or the customers, often want to attend

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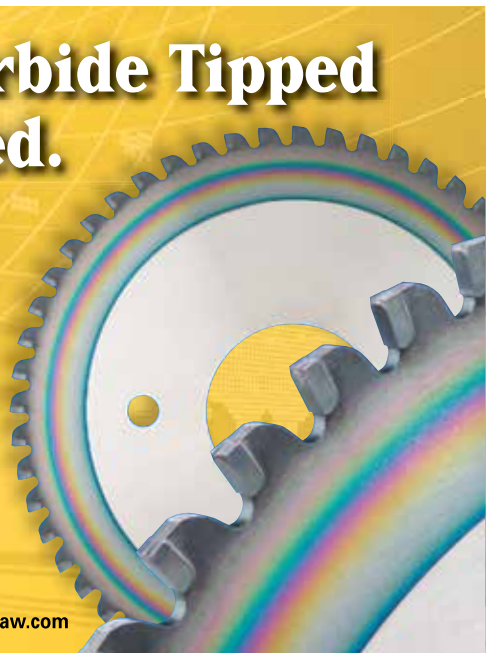
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tests, and this is now possible rather easily”.

Leakage-free and closable

AS Schneider's valves and valve blocks have championed the load tests in a test rig. Even after extreme test conditions, the certified valves not only showed themselves leakage-free, but could also be fully operated, as well as opened and closed repeatedly without problems.

High-performance ball valves made by Hartmann Valves are another example in case. They can be operated in temperatures ranging between - 200 to +550 °C, pressure stages up to 700 bar and with aggressive media. Realised entirely in metal, the sealing systems between ball and seat ring fulfil a leakage rate of A, or O. Special construction features and safety-oriented functions such as DBB (double block and bleed), DIB (double isolation and bleed) and fire safe create higher levels of safety. This is a necessity, as the ball valves are used with all kinds of media, from oil, natural gas, acid gas, brine, oxygen or hydrogen, steam, thermal water and abrasive or degreasing media.

Quenched below 100 °C

Ebro subjected its HP-300 valves to intensive fire tests complying with ISO 10497. The valves were placed under water pressure, the ISO norm demand 75 percent of the operating pressure. “The HP 300 was pressurised with an operating pressure of 37.5 bar,” states Ebro. Afterwards, the valve was

fired with a propane gas, with temperatures reaching 650 to 1,000 °C. A condition which lasted 30 minutes, followed by a first leakage test. “Subsequently, the valve was quenched to a temperature below 100 °C and a second leakage test was conducted”.

Ebro's test objects were nominal diameters DN 80 and DN 200 in two different materials – CrNi steel 1.4408 and C steel 1.0619 – each with a full metal and laminated seal. “The tests were successfully completed, without any complaints”. Mission accomplished.

Material strength

What can increase the likelihood of a valve being certified as fire safe? Strength is important when choosing the material, especially as far as higher temperatures are concerned. “Not only the materials used for the valve housing play a role, but also the material the screws are made from, and naturally also the material used for the seal are essential,” states Schaaf. Only then can a valve withstand its trial by fire, without finding itself under fire.

AS Schneider's company practice shows: “Fire safe valves made from all common materials are in demand,” reports product manager Stefan Keller. “Exotic materials are more seldom,” he adds, as separate certification tests have to be made for different materials groups. Common and proven valves in the oil and gas industry are made from stainless steel and carbon steel.

Ball valves for power to gas

Fire safe products also let valve manufacturers score with special projects, such as power to gas plants. Such valves are successfully used in the “WindGas Falkenhagen” plant, operated by Eon Gas Storage GmbH. Hartmann Valves supplied this German demonstration plant with 24 metallic sealing ball valves, designed to meet the high requirements and safety levels for use with pure hydrogen. Power to gas is a process to change electricity from renewables into chemical energy. The technology is supposed to help feed-in management match electricity production from renewables to consumption, in order to prevent bottlenecks.

Fire safe a seal of quality

Fire safe has long become a seal of quality. Companies in various sectors can't do without this seal, and sometimes even are not allowed to. “We conduct fire safe tests for all new products to be used in such industrial sectors, from the ground up, in order to certify them,” states Keller. Demand, however, depends on the oil price, but is “continuing to rise”. Customers will always need fire safe valves. Innovations in these fields will be presented at Valve World Expo Düsseldorf from November, 27 – 29, 2018.

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Messe Düsseldorf GmbH

E-shops, marketplaces, trading systems – The future of metal trading is digital

The fax and telephone era in the steel and metal trading business is coming to an end. The winners will be the traders who have been quick and purposeful in the digitisation of their processes. The development will lead to fully automatic steel supply via the Internet of things – with or without steel traders.

Some outdated practices have survived in the steel community. The fax machine is one of them. While everyone nowadays has a smartphone in his pocket and social media have been an accepted feature of everyday life for a long time now, modern communication in steel trading still revolves around landline phones and fax machines.

The times are changing, however. “Digitisation of steel trading has only reached the early stages of dynamic development”, says Dr Heinz-Jürgen Büchner. The Managing Director of IKB Deutsche Industriebank in Frankfurt sees customers as the driving force. “As in other trading segments, the trend towards digitisation is in the final analysis likely to be driven by the customers here too.”

Many steel manufacturers are ahead of this. Offers to communicate with steel manufacturers digitally are already being accepted by many steel customers, as the industry expert made clear at an event organised by the steel trading association BDS. Büchner’s conclusion: “In the short or long term, it will therefore be necessary for steel traders to follow suit”.

At the European level, more



than one third of steel sales is transacted via direct sales from the steel mill to the customer. Large customers in the automotive industry in particular buy steel directly from the mill in the context of lengthy contracts. A further 37% is sold via steel service centres. These companies, which specialise in services and machining, operate between classic material traders and manufacturing industries – frequently acting as the services division of steel traders, who lengthen their added value chain via machining, i.e. rolling, sawing, drilling, welding, thread cutting, bending or finishing of steel and aluminium. What the modest word “machining” involves extends as far as the production of complex components for the automotive, construction and machine manufacturing industries.

“It is a striking fact that the percentage of direct deliveries by steel manufacturers is substan-

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tially larger with higher-quality steel”, says Büchner. More than half of coated flat steel products are supplied directly to the end-users by steel manufacturers, for example. The customer-specific solution and the need for more extensive explanation in sales transactions are apparently frequent reasons for this. The analyst concludes that this is both the risk and the opportunity for steel traders: “If the steel manufacturers can be matched via smart digital distribution channels, the loss of market share to them could be stopped”. Büchner emphasises that this is a challenge to steel traders: “Failure to tackle this challenge will be punished, however.”

Gisbert Rühl is keen to avoid this punishment. Impressed by the success of the Amazon online marketplace and in search of new business ideas, the CEO of Klöckner & Co., the steel trading company from Duisburg, began by studying current ideas in Silicon Valley and then continued with an investigation of the start-up community in Berlin. Klöckner, a company with a tradition that goes back more than one hundred years (it was established in 1906), has been transformed into a digitisation pioneer under Rühl’s leadership. Far away from the steel heartland in the Ruhr region, Rühl set up the creative laboratory kloeckner.i in Berlin in 2014, which has been providing the corporate headquarters in Duisburg with fresh ideas from the trendy German capital since then. The steel trader went online with a new web shop in 2016, for example: a steel trading platform that contains data about suppliers and customers. The aluminium business has been expanded at the same time.

Klöckner’s aim in digitising steel and metal distribution is to initiate the end of the linear supply and performance chains that are typical of the industry. It is reported that steel and metal products will be traded via three digital channels to an increasing extent in future: via propriety online shops operated by individual traders, via industry-specific, vertical platforms and via cross-sector, horizontal platforms.

What Amazon is for Klöckner CEO Gisbert Rühl is the online car marketplace Mobile.de for Ralf Niemeier. The managing partner of Montan Stahl GmbH aims to network steel traders and cus-

tomers neutrally with his open trading platform steel.online that was established in 2015. Steel users can submit price inquiries about practically all kinds of steel products to the portal, to which registered traders all over Germany can respond by submitting their quotations. Predefined product categories, geometries and dimensions facilitate input and the search for online quotations. Estimation is to be carried out fully automatically in real time in future. A designer could then upload his entire part list to the platform – with predefined lengths, dimensions and other general conditions – and make a national inquiry. Irrespective of the inquiry volume and complexity, he is then supposed to be able to receive his prices within seconds via dynamic automatic estimation modules and place an order with a single click.

Disruption of the old business models

For the steel trading business, which is bound by tradition, digitisation is not simply a cultural upheaval – it represents disruption of the existing business models. For decades, steel was bought in large quantities as inexpensively as possible and stored. If prices increased, traders sold with high margins. It is not, however, possible to buy steel cheaply and sell it expensively at some future time any more, since structural excess capacities all over the world – particularly in China – are flooding the market and depressing prices. It is no help in the long and medium term either that steel prices increase again temporarily.

Steel trader Klöckner is supplying its approximately 130,000 customers in 12 countries digitally

to an increasing extent, as Christian Prokopp, Director of kloeckner.i GmbH confirms. “We have increased the percentage of business accounted for by digital sales successively to 16% most recently in the third quarter of 2017. This corresponds to an annual volume of about one billion euros”, the digital expert stresses. He reveals that Klöckner is observing a cross-sector trend towards online ordering. It seems that ordering patterns differ according to the size of the customer, however. “Larger customers from the automotive or machine manufacturing industries like to place orders directly with us via EDI connections or via appropriate interfaces in their inventory control systems. Smaller building companies or craft businesses, on the other hand, prefer our online shops”, Prokopp explains, adding that what is particularly interesting is

that not only existing customers are ordering online to an increasing extent: “Thanks to our digital sales channels, we have already obtained a substantial number of new customers in a fiercely competitive market”.

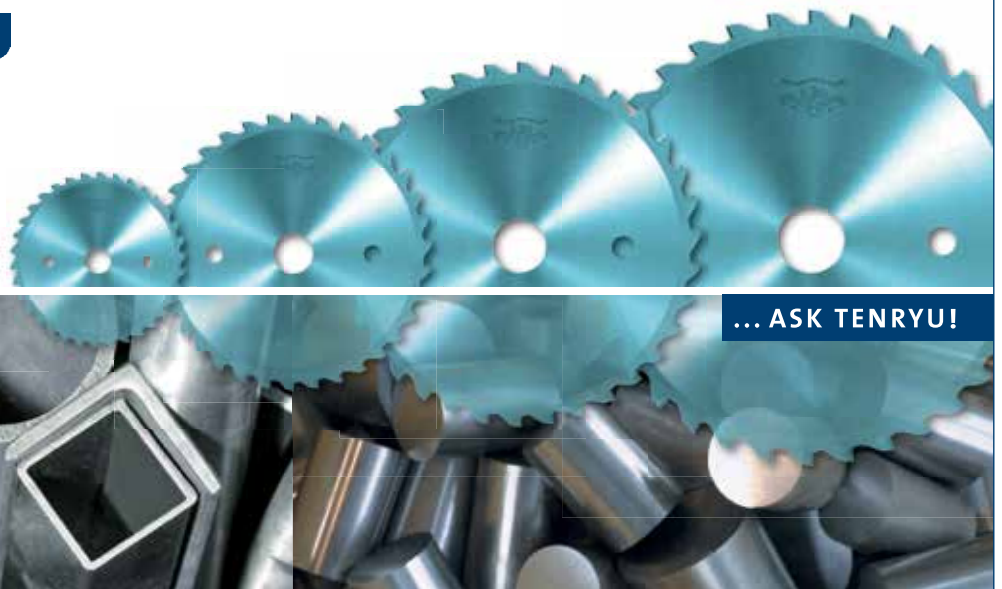
The next steps are coming up in online business. “Now that we have already achieved very good success in the digitisation of our sales channels and the internal processes, the focus in 2018 is on expansion of our product range that is available online. To this end, we are expanding our online shops into marketplaces, by opening them up to complementary products from third parties”, says Prokopp, who adds that Klöckner is at the same time establishing XOM – an entirely open industry platform independent from Klöckner and incorporating direct competitors.



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Material expertise is required

The steel manufacturers themselves – companies like ArcelorMittal, thyssenkrupp and Salzgitter – have also recognised the opportunities offered by direct online trading and operate web shops of their own. Potential customers are, for example, the roughly 36,500 small and medium-sized metalworking companies with their 465,000 employees. The typical steel builder needs to find the next order almost as soon as he gets back from the building site. When tenders are invited for a warehouse or staircase, for instance, he should be familiar with the material costs. The traditional procedure involves the steel builder submitting an inquiry to the trader via fax or phone – not unusually including a request to be phoned back and the waiting time associated with this. He only receives an answer during normal business hours anyway. Days can as a result go by before a steel builder can submit a binding offer. In an e-shop like the one operated by Salzgitter, products needed for the design in question can be compiled online, prices can be obtained immediately and estimates can be made.

The Amazon principle of buying conveniently online whenever and wherever the customer wants – at home at half past two in the morning or on Sunday morning while on a skiing holiday – is

the model in B2B business too. Not all online material traders go as far as thyssenkrupp in this context, however. The latter's new e-shop materials4me focusses not only on professionals but also on ambitious

DIY enthusiasts. In doing this, Germany's biggest steel manufacturer is competing with such cross-sector platforms as Amazon, Alibaba and Google, all of which offer materials like steel and aluminium, albeit only a very limited selection of standard products without any major service.

Steel is not a standard material, however; it is instead a structural material that can be put to many different uses and is available in Germany in about 2,000 flat steel or long versions. Steel products are alloyed, rolled and shaped in accordance with the customers' requirements. Users regularly expect steel mills to come up with new solutions to problems and steel manufacturers open up new markets for their customers by supplying innovative products. The business therefore requires intensive consultation, so that steel trading and service operations are very diverse.

Opportunities for newcomers to online trading

Whereas major steel traders like Klöckner or steel manufacturers like thyssenkrupp operate their own online shops, a shop of their own is often too complicated and too expensive for smaller traders. For customers, it is in addition too time-consuming to have to search different shops in order to compare offers. Newcomers to online trading establish contact between as many traders as possible, including smaller ones, and customers.

"There are in general surprisingly many successful entrepreneurs in the steel trading business who are open to change and are looking for new opportunities for pioneering activities", says Stefan Grethe. Before the young entrepreneur established an online marketplace for steel in 2014 with the start-up company Mapudo in Düsseldorf, he worked for the thyssenkrupp steel trading operations. "As project manager, I analysed the customer and order portfolios of nine sales companies in Europe, the USA and Asia and discovered: the situation is the same all over the world and there is considerable digitisation potential in stock-holding steel trading."

The response to Grethe's answer from the steel industry varied. "Many found the approach very good, while others thought it came too early or rejected the concept categorically." Even large market players like the global steel pipe manufacturer Vallourec are among the partners in the online marketplace for materials today. "It is very evident on the supplier side that steel and non-ferrous metal traders have become much more open to the idea of selling via online marketplaces", Grethe is pleased to report. The customers come from many different industries, from fitters to steel and metal builders and from medium-sized industrial companies to large industrial maintenance groups. "What they all have in common is that they need to procure materials quickly and simply, in order to have more time for activities that add value", the Mapudo founder says and points out that developments in the second half of 2017 in particular were very encouraging; the total transaction volume

was higher than expected. Further services like machining are to be added in future. "The initial steps in this direction have been taken with mitre cutting and sheeting with customised dimensions, but a great deal still needs to be done", Grethe admits. To him, the fundamental rule is: „Where we can create added value, we will develop new functions in liaison with suppliers and buyers."

Jürgen Wixler, Director of alloys2b GmbH in Munich, has modelled his operations on the way social media work. Alloys2b has focussed on steel mills and foundries that need master alloys, alloys and non-alloyed material. "We started with a marketplace and very quickly developed into a software-as-a-service (SaaS) solution", explains Wixler. Alloys2b operates on the basis of the principles of a private tendering platform: buyers compile their own supplier pool, with whom they trade, and the invitations to tender go only to these suppliers. Comparable to a friendship request on Facebook, customers can invite new suppliers by e-mail and thus test the first stage of future co-operation, before expensive background checks are made. In this context, the system acts as a fast, digital communication channel between the participants. "The special features of alloys2b are simple operation and product customisation – an in-house development", Wixler promises. "This enables standard products to be found and, if necessary, be adapted to individual requirements or complex products can be created – all without the need for familiarisation or prior workshops."

Wixler has developed the system into a kind of social media plat-

form for business customers. The extended platform is already online as a trading system for agricultural buying and selling. "At the moment, we are looking for partners to introduce the new trading system in the metal industry." Wixler is convinced: "We believe that the future of metal trading lies in an open platform and not in isolated solutions."

The machine orders steel

What will the future of steel trading be like? Everyone agrees: "The future of steel trading is digital". While there is further agreement that the winners will be the traders who have been quick and purposeful in the digitisation of their processes.

It is, however, also possible that many steel traders will no longer be needed at all in future.

In the Industry 4.0 era, developments will lead to digitisation of the entire supply and added value chain. In smart factories, stocks and machines are connected to each other directly via the Internet of things (IoT). If the system identifies that the steel available on the production machine is running out, an order is placed – with the steel trader or directly with the steel mill. What sounds futuristic could soon become reality. That at least is what the start-up company Axoom thinks, that has created a complex Industry 4.0 ecosystem. The company from Karlsruhe has been established by the machine tool manufacturer Trumpf. Its partner in this venture: the steel trader Klöckner.

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TUBE show results over the top for ASMAG Group



ASMAG Group participated at this year's TUBE and WIRE show with booths in both sections. With a steady stream of show attendees, ASMAG was busy all the time. A great number of international visitors came with serious interest and active projects. Representatives of ASMAG's office in Italy and ASMAG's US subsidiary were also at hand to directly support customers from their respective markets.

"The high number of qualified leads reflect an excellent world-wide economic situation" comments Herbert Plank, Vice President Sales and Marketing. "Our booth at the wire section with our partner UPCAST was well frequented and visitors took interest in their technology."

SEUTHE staff greeted customers, both new and old, and sales engineers spent time with visitors

explaining SEUTHE technologies and answer questions. A high-light at any show is when customers place orders. It is a culmination of efforts and a testimony to SEUTHE's quality and innovative technology. An international customer just did that and placed an order for two tube welding lines.

INGENIA, the newest member of the ASMAG Group had their debut at TUBE. Known for its material handling automation, crane technology and pre-treatment expertise, INGENIA had a tremendous success at the show.

"ASMAG is pleased with overall attendance, the quality of discussions and the outlook for the next few years is very encouraging. It underlines the leadership position of ASMAG Group", summarizes Plank.

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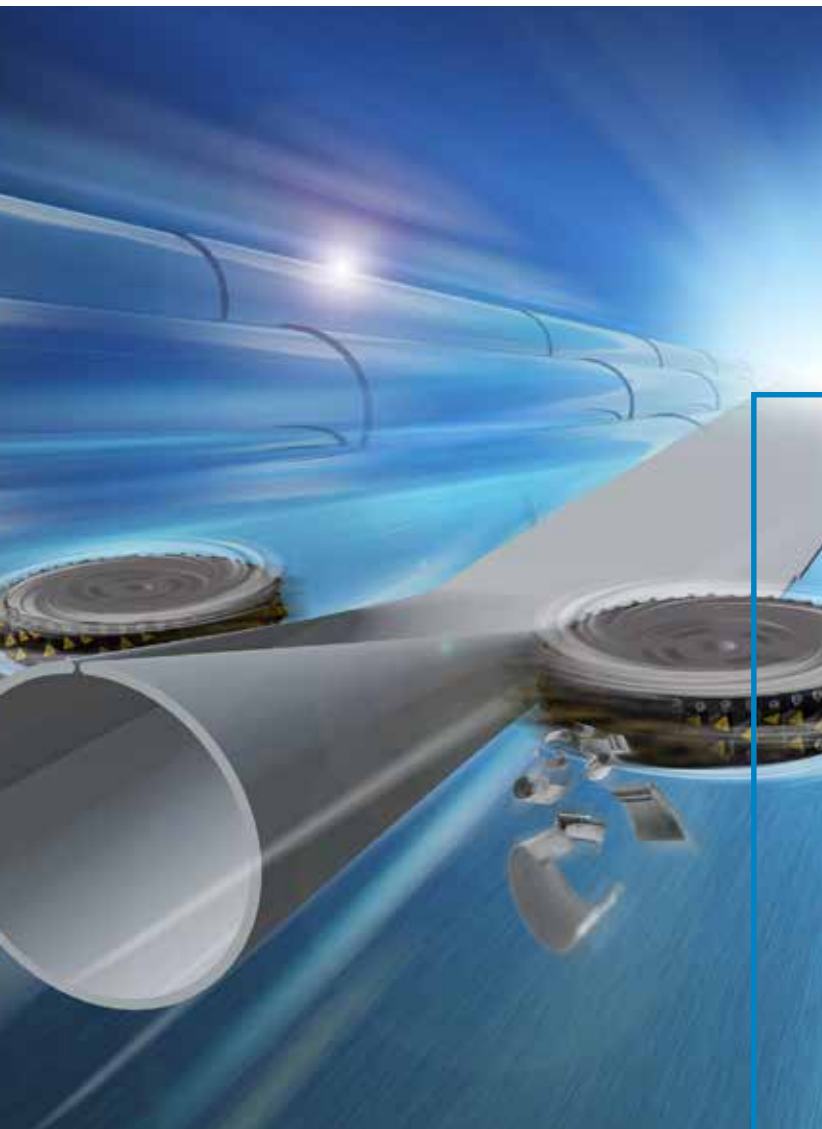


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AIST Tadeusz Sendzimir Memorial Medal presented to Gianpietro Benedetti



Danieli chairman is recognized for leadership in technological breakthroughs for steel production

The Association for Iron & Steel Technology presented its 2018 AIST Tadeusz Sendzimir Memorial Medal to Danieli Chairman Gianpietro Benedetti, in recognition of his leadership in steelmaking technology and plant building over four decades.

As the Chairman of Danieli, Mr. Benedetti's leadership has been instrumental to a long series of technological breakthroughs for steel production, in particular for minimill operations. Among the many achievements have been the

world's first endless casting-rolling plant for long products, the MI.DA® Micromill process, and the DUE Danieli Universal Endless process for continuous thin-strip casting and rolling.

As noted by Giovanni Arvedi, President of Finarvedi SpA, Mr. Benedetti "followed an original path to technological development revealed in various applications in the long products sector, and also in the flat products sector, more particularly in the thin slab casting area."

The AIST Tadeusz Sendzimir Memorial Medal was established in 1990 to perpetuate the memory of Dr. Tadeusz Sendzimir's achievements and engineering contributions in developing process equipment for the steel industry. The award recognizes individuals who have advanced steelmaking through the invention, development or application of new manufacturing processes or equipment.

Past winners of the Sendzimir Memorial Medal have included F. Kenneth Iverson, Irving K. Rossi, and John A. Vallomy.

The award presentation took place in Philadelphia on May 8, at the President's Award Breakfast during the AISTech 2018 event.

"Through his perseverance, expertise, strategic vision, he has guided the company to achieve global prominence by striving to lead the technological evolution of the steel industry," Mr. Randy C. Skagen, president of AIST, noted in its citation.

In 1961, Mr. Benedetti earned his diploma as an electrical engineer. That year, he began working in Danieli's design technical offices, advancing to mechanical project engineer in 1963 and then plant start-up engineer in 1966. He has continued to guide the growth of Danieli, which today employs tens of thousands of people globally, designing, manufacturing, delivering, installing, maintaining and updating metallurgical plants. He is widely recognized by international steelmakers and metal producers alike, having led the business for decades.

In addition to the MI.DA® Micro-mill, Mr. Benedetti is the holder of other numerous patents for steel-making machines and processes. Over 80 inventions have been registered under his name.

With 400 different patents, Danieli is credited with several

hundred inventions that advance steel production, from ore processing to finished long and flat products.

Over the last 10 years, Daniel has invested 140 Million Euro per year in research and development activities.

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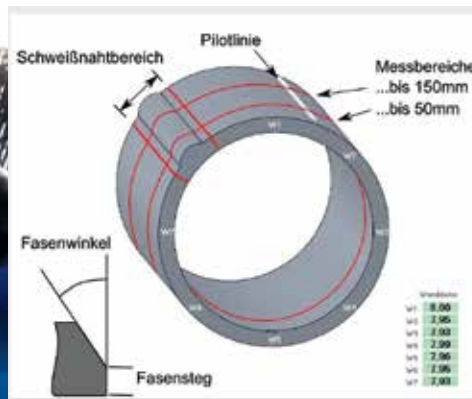
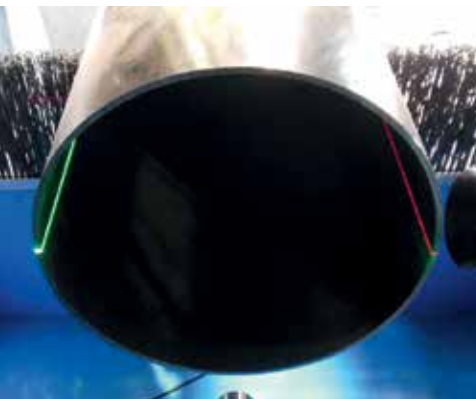
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Dneprovsky special tools plant LLC

Biggest company in the CIS, specialized in production of metal-cutting tools and machinery parts



Dneprovsky special tools plant LLC is the biggest company in the CIS, specializing in production of metal-cutting tools and machinery parts for metallurgical, railway and pipe industries.

At the factory, the program of equipment modernization and technological processes is carried out. All products are manufactured using modern technological equipment:

- four units of high-tech 5-axis milling machining centers produced by Spinner Precision Machine-Tools, each of which is not older than five years. For example, the 5-axis machine of the U5-630 model was put into use in March 2017;
- two precision lathes, which in combination with the milling function give high productivity;
- milling 3-coordinate machine of increased power MVC 1300.

Also, the corporation's investment plan provides for a five-axis high precision machine to further producing high-quality and high-precision axial tools.

This year, another three-axis milling machine VC1650 was put into operation to expand the range of manufactured products.

At the same time, our desire to work with new precision equipment does not bypass the universal equipment park, in particular, in the near future, the priority is the launch of a number of universal milling machines for preliminary processing of blanks.

The modern approach to solving the problems in the field of processing technologies is reflected in the effective use of the capabilities of existing equipment.

Thus, the use of the supply of coolant under pressure through the tool opens up new opportunities in providing high quality and expanding the range of produced products, and also increases the service life of the equipment by reducing the loads on the main machine components that arise when the tool is overheated and wear of its cutting part.

The use of the latest solutions in the construction of cutting inserts used in production, allows to increase the productivity of equipment, thereby processing a greater number of orders.

Advantages of the treatment in the hardened form:

- increased accuracy;
- the number of operations reduction.

One of the main tasks of the company is the constant expansion

of the range of tools. Currently, we have mastered more than 1000 items of non-standard tools.

Technological capabilities of the plant provide a full cycle of production tools of any complexity and provide an opportunity to control the quality at all stages of production.

Ensuring a high quality of production is impossible without an appropriate measuring instrument. Representatives of LLC "DSTP" repeatedly visit all the exhibitions and select the best measuring instruments for the assigned tasks. So in 2016 an electronic measuring instrument was installed by the famous German company Mahr GmbH. Also in 2018, the ZOLLER measuring machine is planned to be launched, which, combined with high-precision equipment, will ensure the European quality level of the domestic instrument.

The enterprise is certified in accordance with the requirements of the international standard ISO 9001: 2008.

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Huntingdon Fusion Techniques HFT®

Cut Costs, Not Corners with QuickPurge®



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Welders are always looking for time and cost savings when pipes need to be purged of oxygen before, during and after welding (weld purged). Weld purging large diameter pipework fabrications and pipelines not only carries a large price tag when it comes to time, it can also cost a lot in inert gas.

Weld purging specialists and developers Huntingdon Fusion Techniques HFT® manufacture QuickPurge® Tube, Pipe and Pipeline Weld Purging Systems. QuickPurge® Systems are designed to be inflated inside of the pipe, drastically restricting the volume that needs to be purged, so much so that the Systems pay for themselves in just one or two welds.

A Customer in the USA said: "What an enormous saving in waiting time for our welders. Normally we wait several hours for our 30" stainless steel pipe joints to be purged and now we can start welding in under 10 minutes."

QuickPurge® Systems are available in sizes 6 to 88" (152 to 2,235 mm) and are used in many Industries such as Refineries for nickel alloys, Mining Operations

for titanium, Nuclear Power Stations for stainless steel and the Oil and Gas Industry for all high quality pipe joints. Using scientific innovations, QuickPurge® can help welders achieve consistent oxygen levels as low as 10 parts per million (ppm), allowing zero colour welds to be achieved with no loss of corrosion resistance caused by oxidation.

IntaCal® combined with the integrated PurgeGate® device makes it possible to safely inflate the systems with argon gas, for sealing and then purging the space between the dams where the weld joint is located. With PurgeGate®, any risk of over-inflation due to pressure or flow increase is eliminated.

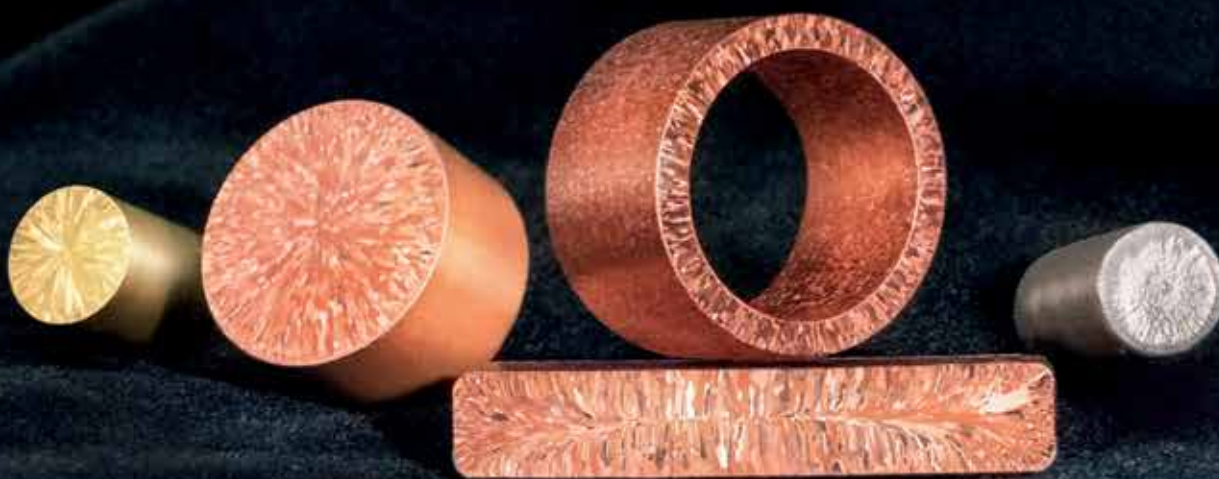
All Systems are manufactured as standard with a hose for connecting a Weld Purge Monitor®, which can read oxygen levels down to as low as 10 ppm.

Specially designed QuickPurge® Systems with longer sleeves are also available for pipework with 90° bends.

QuickPurge® Demonstration Video is available on YouTube at: <https://youtu.be/Q4MJTsaxN0>.

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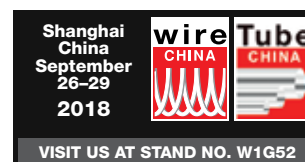


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There are many applications where pipes carrying chemical fluids (alkaline or acidic) or that are exposed to high temperatures need to be plugged or sealed.

The Pipestoppers® Division at Huntingdon Fusion Techniques HFT® manufacture a Range of heavy-duty Aluminium Plugs to allow for arduous duties such as exposure to high temperatures and immersion in chemicals, in sizes 1.5 to 36" (38 - 900 mm).

Ron Sewell, Chairman for HFT® said: "Often, in refineries, offshore operations, plumbing operations and domestic and industrial water activities, heavy-duty plugs are required to block pipes where the plug is likely to be immersed in chemicals or exposed to high temperatures. Our Range of Aluminium Plugs can be used for leak testing, isolation, sealing, stopping and weld purging of pipes in harsh environments."

Available up to 36" (900 mm) diameter, these lightweight, but heavy-duty Plugs are manufactured with a friction-free washer to ease tightening of the ring nut to expand the rubber ring to make a completely leak tight seal. In addition, because the Plugs are neutrally buoyant they can also be used in sub-sea environments.

The standard natural rubber seal can be replaced with silicone, nitrile, neoprene or Viton rings to ensure they can be used for applications where greater resistance to a variety of materials is required, allowing for use at temperatures up to 350°C (662°F).

The Pipestoppers® Aluminium Plug Range, which starts at 1.5" (37 mm) diameter, has a wide variety of other applications throughout sewage and drainage systems, ducting and conduit, swimming pools, boating, shipping, offshore applications and so on. The Plugs are also used to seal and protect tanks, vessels and containers during cleaning and transportation, particularly when they are pressurised with inert gas.

All Plugs conform to British Standards BS8005 and BS EN752-4 for low pressure testing and sealing of pipes.

Other Plugs and Stoppers in the Pipestoppers® Division include Nylon and Steel Mechanical versions for low, medium and high pressure stopping requirements and Inflatable Stoppers that can be transported anywhere at low cost, quickly and easily for a number of low pressure and medium pressure plugging and stopping.

Huntingdon Fusion Techniques HFT® have a worldwide Exclusive Distributor network, which can be found at www.huntingdonfusion.com.

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Huntingdon Fusion Techniques HFT®

Glass Fibre Backing Tape gives improved Weld Root Profiles

Weld Backing Tape® is a common material used where manual welding cannot control the weld root profile sufficiently, or when an automatic weld process is unable to reach satisfactory speeds while still obtaining satisfactory underbeads.

Ceramic Fibre is in use within the Welding Community, which has a melting point of 1,800°C, causing concern when temperatures during TIG welding can reach up to 6,000°C. A superior alternative to such material is Glass Fibre, which has no true melting point.

Weld Purging Experts Huntingdon Fusion Techniques HFT® have a Range of Glass Fibre Weld Backing Tape®, which can support the highest of temperatures.

Ron Sewell, Chairman for HFT® said: "A cost-effective way to provide support for molten metal below a weld joint, is to use Weld Backing Tape®. Our Backing Tape is able to support all welding currents from 80 amps, up to as high as 600 amps, giving welders and welding engineers the support to produce perfect weld underbeads."

HFT® Weld Backing Tape® is a glass fibre weld backing system

that supports and protects the weld root from oxidation. It will trap the inert gas from the weld torch to hold the gas surrounding the weld pool, effectively providing a back purge facility. HFT® manufactures four grades of Weld Backing Tape® for use up to 80, 160, 240 or 600 Amps."

Each tape comprises a 3" (75mm) wide aluminium adhesive tape, in the centre of which is a 1" (25mm) wide band of woven glass fibre matting running down the centre. The glass fibre matting has differing thicknesses to match the welding current in use.

Once the tape is positioned with the glass fibre matting under the centre of the weld joint, the welders can start their arc. The welding torch argon flow has plenty of space to move between the pores of the matting, which allows the welding arc to stabilise and start forming the weld root.

Using Backing Tape® it is possible to weld with MIG, TIG (GTAW) or Plasma (PAW) techniques for the joining of all weldable metals without change to the chemistry or metallurgy of the weld.



Backing Tape ABT PHO 02C Single Roll



Backing Tape ABT PHO 09C Stage 2 Welding

+++ The **ITA** on **social media**. Like on **Facebook**. Link up on **LinkedIn**. Connect on **Google+**. Use our platforms to further your business connections. Get networking! +++

IMS Messsysteme GmbH

Step into the next dimension!



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X-3Division Tube Surface Inspection

Imagine you could see virtual images of the billets, blooms or tubes directly after they leave the rotary hearth furnace or continuous casting resp. rolling mill. Every infringement of a limit value would be shown. You would know immediately where a tool is damaged or worn.

In tube production, surface defects are often perpetuated through the complete process chain. Non-stop surface inspection from block to finished tube is, therefore, critical for the quality of the final product.

The key to a very high measurement accuracy is the geometric stability of all components concerned and the use of in-house developed high power lasers in combination with newest high speed 3D camera. Every effort was made while designing this system

to ensure that every laser camera system operates individually. Additionally, all systems together remain in constant alignment to each other within tight tolerances.

The suitable number of laser camera systems, needed for a complete and simultaneous measurement of the product, is arranged circularly. Four to eight sets are typically used, depending on the complexity of the product and the required performance. The minimum and maximum product dimensions are also taken into consideration.

The IMS X-3Division tube surface inspection system is ideal for hot and cold applications because it automatically detects and classifies defects and their positions. The IMS system records with a resolution of 0.15 mm in depth and transverse direction at full production speed up to 10m/s.

Inductotherm Heating & Welding Ltd

Hydro Precision Tubing Tonder selects – Banyard LFi Smart System

Banyard are pleased to announce the successful contract for supply to Hydro Precision Tubing Tonder (HPTT) plant in Denmark, with imminent dispatch of 2 x Banyard LFi Smart systems, which consists of 2 x Zero Friction, Multi-layer, Multi Zone coil Induction Heaters for 9" aluminium billets, to work with HTPP's P25 press upgrade programme - The Heaters are each 750 kW and the system includes Cold Billet Positioning Systems, Over-

head Manipulator and full Control Interface to the press.

The HPTT project team has worked closely with the Banyard project team to fully assemble the equipment in UK, to facilitate a quick install in Denmark. In the forthcoming weeks representatives of HPTT will be visiting the Banyard manufacturing facility at Inductotherm Heating & Welding in Basingstoke UK, to conduct the Supplier Acceptance Tests before

the system is carefully dismantled and loaded ready for shipping. The full installation and commissioning will be completed in Denmark, during the summer of 2018.

Inductotherm – Banyard will celebrate 50 years continued service to the Aluminium Industry in 2019, we look forward to meeting existing and new customers at Aluminium Dusseldorf 2018 and present the latest generation of LFi Smart System for your extrusion process.

Inductotherm Heating & Welding Ltd

TUBE & WIRE 2018 Show

After an extremely hectic/busy week, Friday saw the end of yet another very successful “Tube and Wire” exhibition in Dusseldorf. Inductotherm Heating & Welding had a hugely successful show with an increase in sales leads and some excellent networking opportunities. We relished the opportunity to talk face to face with clients, old and new, offer them some hospitality and introduced them to our new virtual reality suite.

Having stands in both the TUBE and the WIRE sections enabled us to display our industry leading experience and product knowledge across both disciplines, thus demonstrating why we maintain our dominant position as the leading induction supplier in the industry - with solid sales leads coming in thick and fast on both stands.

We now start the process of contacting customers, ensuring we give each and every one a personalised service geared to meet their individual needs. We are strongly committed to excellent customer service not just at point of sale.

Inductotherm Heating & Welding were also very proud that one of our Sales Managers - Dave Clowes who was presented with a “Best Fundamentals Award” after writing and presenting his white paper at the International Wire & Machinery Association (IWMA) CabWire Industry Forum in Dusseldorf at the latter end of last year. “I was asked to participate to give a talk based on the “Fundamentals” of the wire market sector”. Says Dave Clowes Inductotherm Heating & Welding



Sales Manager. “Amongst the topics covered by other speakers were subjects such as wire drawing, cable design and so on, whilst I of course presented the fundamentals of Induction heating. Thank you to those that deemed me the worthy recipient, I feel somewhat humbled by the whole thing.” Inductotherm Heating & Welding LTD are immensely proud of Dave’s achievement and delighted that he readily shares his knowledge with our customers.

“We have had a great show and signed some significant deals”. Says Wayne Hine – Inductotherm Heating & Welding Sales Director. “The market seems very buoyant presently, which is splendid news for the industry at large. We have also celebrated the signing of new contracts and personal achievements of members our THERMATOOL and RADYNE sales staff.”



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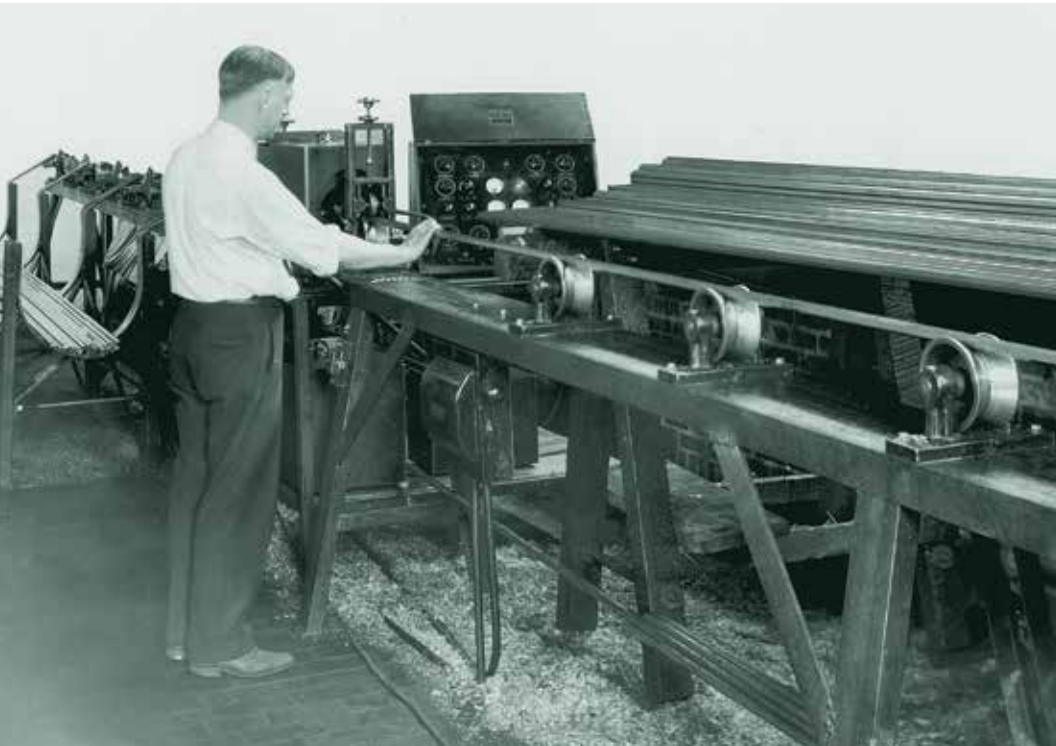
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Magnetic Analysis Corporation

Magnetic Analysis Corp. Celebrates 90 Years



1936 – 60 Hz Electromagnetic Bar Tester

Magnetic Analysis Corporation (MAC), a leader in nondestructive testing, is celebrating 90 years of designing and supplying innovative inspection instruments and systems for metal manufacturers throughout the world.

Founded in 1928 in Long Island City, NY, at a time when testing usually meant “sampling” procedures that destroyed or altered the product being tested, MAC developed electromagnetic techniques to “nondestructively” test steel bars without modifying the product. In 1934, MAC introduced the first successful tester to identify cracks in steel bars in a production mill.

Today, operating on an international scale, MAC continues to find innovative ways to help tube, bar, wire, and parts producers meet increasingly demanding specifications for quality. “Using our unique ability and experi-

ence with multiple technologies, including eddy current, ultrasonic, phased array, and flux leakage, we don’t just sell a product, we sell a solution – a test solution that is based on the customer’s product, mill configuration, specifications, applications, budget and other specific needs” says Dudley Boden, MAC’s President and CEO.

Boden continued by saying that “as we celebrate this 90-year milestone, we are renewing our long-standing dedication to customer service, while at the same time focusing on an exciting future for NDT with new technologies and applications.”

Three facilities form the backbone of the company: MAC’s ISO 9001-2015 certified manufacturing and engineering headquarters in Elmsford, NY; a manufacturing and ISO/IEC 17025:2005 laboratory-certified plant in Boardman, Ohio; and Magnetic Analysis Nordic’s manufacturing plant in Östersund, Sweden.

With the support of its Subsidiaries, Field Engineers and Representatives, MAC serves customers throughout Europe, Scandinavia, Russia, South America, India, Korea, China and Australia.

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Roll-Kraft

Roll-Kraft names director of operation

Roll-Kraft announces the promotion of Kevin Gehrisch to the position of Director of Operations at the company's headquarters facility in Mentor, OH. His new responsibilities include oversight of the Mentor plant with an unrelenting focus on achieving the company's vigorous goals of 100% on-time delivery, and 100% first-time performance of Roll-Kraft tooling. He will continue his current leadership in the area of sales and strategic planning. He has been with the company for eight years, and

has previous experience in engineering.

Gehrisch is a 2012 graduate of Ohio University with a degree in Finance.

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FIVES, CUSTOM ENGINEERED MACHINES FOR THE PRODUCTION OF SEAMLESS AND WELDED TUBES



Fives provides a wide range of capabilities, process expertise and operational support to maximize our client's results. Our global offer covers engineering, manufacturing and supply of tube making facilities and custom engineered machines under the historical names of Abbey, Bronx, OTO and Taylor-Wilson to process seamless and welded tube and pipe products:

- Slitting lines, entry systems, welded tube mills, cut-off units, run-out tables, tube handling units, drawbenches
- Heavy duty tube and pipe straightening machines
- Hydrostatic pipe testers, pipe end finishing, collapse and leak testing machines
- Brushing and Bead rolling machines
- Robotic and Layering Packaging systems for rounds, shapes, and bars
- Automation and control systems
- A full range of services: revamping, upgrades, equipment evaluation and productivity reviews
- Smart maintenance

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— Tube and Pipe

<http://tube-pipe.fivesgroup.com>



fives ultimate machines
ultimate factory

Schuler AG

Schuler raises sales and earnings to record levels



- **Yadon and AWEBA tap new market segments**
- **Savings above target thanks to manufacturing concept**
- **Equity ratio reaches 39 percent for first time**

Press manufacturer Schuler AG raised sales and earnings to new record levels in 2017. The global market leader based in Göppingen, Germany, posted consolidated sales of € 1.23 (prior year: € 1.17) billion with particularly strong growth in North America and China. Compared to the previous year, the operating result (EBITDA) rose to € 141 (€ 123) million. As a ratio of sales, this corresponds to a margin of 11.5 (10.4) percent – putting Schuler among the leaders in Germany’s machine and plant engineering sector. There were important contributions to the successful annual financial statements from the two strategic investments Yadon and AWEBA (included in the full-year consolidated figures for the first time), as well as from improved cost structures in Germany following the implementation of the company’s manufacturing concept. With a record equity ratio of 39.0

percent, Schuler has created excellent conditions for the further development of the Group.

At the balance sheet press conference in Göppingen, CEO Stefan Klebert stated: “The healthy annual financial statements for 2017 reflect the successful changes made over the past few years. Earnings were driven by both the new manufacturing concept and the acquisitions Yadon and AWEBA. These two takeovers have not just been a financial success story, but have also helped Schuler tap strategically important domestic and foreign markets.”

New orders boosted by strong final quarter

New orders received by Schuler in 2017 made uneven progress. There were order increases of over 20 percent in some cases in China, the Industrial division, and for die solutions (mainly AWEBA). By contrast, there was a noticeable decline in orders received by the Automotive division. The

main reason for this trend is the decision of major car manufacturers to channel considerable funds into the expansion of electromobility while temporarily postponing investment in new production capacity. Schuler itself is not adversely impacted by the change to new drive technologies. The company also supplies press lines to manufacture body parts for electric vehicles, as well as lines to produce electric motor laminations and batteries.

For the Group as a whole, new orders fell slightly to € 1.14 (€ 1.20) billion in 2017. The strong final quarter of the year accounted for a third of this total. As of December 31, the order backlog stood at € 0.90 (prior year: € 1.01) billion. In the first weeks of 2018, new orders maintained their encouraging momentum from the last quarter of 2017 and continued to make good progress, especially in the Automotive business. All in all, Schuler expects sales and earnings before special items

Schuler Group at a glance (IFRS)		2017	2016
Sales	€ million	1,233.1	1,174.2
New orders	€ million	1,141.0	1,199.5
Order backlog	€ million	901.6	1,013.1
EBITDA	€ million	141.4	122.6
EBITA	€ million	117.1	101.8
EBT	€ million	106.4	95.1
EBITDA margin	%	11.5	10.4
Group profit	€ million	72.1	77.4
Total statement of financial positions	€ million	1,276.3	1,361.3
Shareholders’ equity	€ million	498.4	438.4
Equity ratio	%	39.0	32.2
Net financial status	€ million	125.4	116.3
Employees incl. apprentices	persons	6,570	6,617

to reach their prior-year levels in 2018.

Largest share of sales in Europe

At € 528 (prior year: € 524) million, Europe accounted for the largest share of consolidated sales totaling just over € 1.23 billion in fiscal year 2017. Sales in China rose to € 310 (€ 290) million. Schuler's business in North America made strong progress with increased sales of € 328 (€ 271) million. There was a slight decline in Group headcount to 6,570 (6,617) as of December 31, 2017, of which 2,333 (2,284) people are employed outside Germany.

In its first full year of implementation, the new manufacturing concept for the Group's German facilities already led to savings and efficiency gains of around € 30 million in 2017. These savings were achieved despite the positive sales trend and were well above target.

"Growth from new markets and innovative products"

At over € 106 (€ 95) million, Schuler's earnings before taxes (EBT) were well above the prior-year figure once again in 2017. One driver of this operating result, with a contribution of around € 18 million, was the Group's technology and demonstration center in Tianjin, China, which was sold to an industrial partner in 2017 following a successful operational phase. Yadon and AWEBA also made positive contributions to sales and earnings.

CEO Klebert: "Yadon clearly demonstrates that growth is primarily generated via new markets and innovative products. Yadon presses form the basis for successful new product offerings

in the USA and, in the future, also in India, Vietnam, Sri Lanka and selected European growth markets. At the same time, Yadon's link-drive press launched in 2017 is its first product to offer higher press forces of up to 2,500 metric tons – a joint development project of our teams in China, Brazil and Germany."

Digitization and new Industry 4.0 solutions

Following the roll-out of its MSP2-400 press line, Schuler has been working hard on the development of new products for the medium price-performance segment. Schuler has launched a large number of internal projects for the further digitization of its products and company processes. At its facility in Gemmingen, for example, the company is setting up a center of expertise for the digital monitoring of part position and temperature, as well as data analysis for the optimizing of processes. At the new Schuler Innovation Tower in Göppingen, training rooms are being equipped where Schuler and its customers can prepare for the challenge of increasingly networked press lines. Schuler will be showcasing specific Industry 4.0 applications in its own Smart Press Shop at the leading industry trade show "Euroblech" in Hanover, Germany, in October 2018.

Further improvement in equity base

Against the backdrop of its positive earnings trend in 2017, Schuler – in which the Austrian ANDRITZ Group holds 95 percent of capital stock – was able to make further improvements to its capital base. Shareholders' equity rose to € 498.4 (€ 438.4) million. As a result, the equity



ratio reached 39.0 (32.2) percent – its highest level since the company's IPO in 1999. CFO Norbert Broger stated: "Schuler boasts an extremely healthy capital and liquidity base that provides scope for growth-enhancing investment while giving us the capability to cushion cyclical dips – although none are currently in view."

Capital expenditures decreased as planned to € 26.9 (€45.8) million in 2017, but continued to exceed depreciation. The construction of a new technology center in Göppingen – the Schuler Innovation Tower officially opened a few months ago – had led to record capital expenditures in 2016. At € 125.4 (€ 116.3) million, Schuler's net liquidity (liquid funds less financial debt) was well above the prior-year figure.

Schuler AG

Smart Press Shop live



At the EuroBLECH in Hanover, Schuler will present the new MSP 400 servo press with the Smart Assist operator software.



At the Hot Stamping TechCenter in Göppingen, Schuler is currently conducting a field test in the area of condition monitoring.

At the EuroBLECH trade fair, Schuler will demonstrate solutions for digitalization and networking on its new MSP 400 servo press

At the last EuroBLECH in Hanover in 2016, Schuler unveiled the Smart Press Shop, its vision for a digitally networked intelligent press shop. At this year's EuroBLECH, the world's leading trade fair for sheet metal working, the specific benefits of forming technology solutions in the age of Industry 4.0 (the Industrial Internet of Things, IIOT) will be on display with the theme "Discover the Digital Today" at the Schuler exhibit (located at Stand F82 in Hall 27). Schuler's main exhibit display will be made of genuine iron and steel—its new MSP 400 servo press—and will give visitors an opportunity to experience intelligent software applications like the Smart Assist and the Optimizer.

"The digital transformation of the press shop is already well underway," says Domenico Iacovelli, Schuler's CEO since April 2018. He adds: "At EuroBLECH, we will demonstrate that both major automakers and medium-sized suppliers can use the Smart Press Shop for more efficient production and fewer rejected parts. This means that we can give them the competitive edge they need—true to our motto for this year's event: Ready to Win Together."

As an added highlight, Schuler will also use EuroBLECH to showcase the latest innovations in servo press lines and hydraulic presses, as well as new developments in

automation and transfer technology. Die specialist AWEBA will be on hand at the neighboring stand (E82) to present its wide range of products and extensive engineering expertise in the areas of forming, blanking, fine blanking, and hydroforming. Backed by its subsidiary AWEBA, Schuler has the distinction of being the world's only supplier of presses and automation as well as dies used to manufacture motors for electromobility, the latter of which will also be a focus of Schuler's exhibit at the event.

Enhancing overall equipment effectiveness

Schuler has also already demonstrated its ability to fully network different production facilities with its systems for constructing large-diameter piping ("Pipe ID 4.0") and train wheels. Among other things, this process requires the availability of data necessary for determining and increasing the overall equipment effectiveness (OEE). The data is prepared by the system so that a quick glance is all it takes for the production manager to determine the total number of parts produced, how many of these parts are acceptable, and which shift had the best performance.

The collected data also serves as a basis for functions like the tracking & tracing of safety-related parts. Among other things, the system links these parts to information about the starting material used and the material's origin, about the system's lubrication and drawing force, and about other production conditions. All of

this makes it possible to provide a complete trail of documentation in the event of quality-related complaints.

To monitor the condition of individual components for changes, wear, or damage (a feature referred to as condition monitoring), Schuler is integrating more and more sensors into its machines; such as those which measure vibrations and temperatures, for example, so that this data can be intelligently processed and displayed. Currently, a large-scale field test is in progress in Göppingen involving a 1,600-ton hydraulic die hardening press, which produces parts for lightweight automotive construction from sheet metal heated to 930 °C. A live feed from the Hot Stamping TechCenter is planned for this year's Schuler exhibit.

Virtual training for operators of press lines

EuroBLECH visitors will also be able to catch a glimpse of the new virtual training system from Schuler's Forming Academy. It serves as a basic training of the operators dealing with the real forming systems in the press shop. This takes place in virtual space while a new system is being put into operation or the production is already running. Thus, the production in the press shop is not disturbed and the operators can be optimally prepared.

"Schuler is putting forming technology on the fast track to the digital future," notes CEO Domenico Iacovelli, who then offers a comparison to bobsledding: "We provide the initial push, but the customer handles the technically advanced equipment."

Schuler will be presenting at EuroBLECH in Hanover from October 23 - 26 at Stand F82 in Hall 27. AWEBA will be located directly next door at Stand E82. Journalists are invited to attend the press conference to be held at the Schuler stand at 9:30 a.m. on Tuesday, the first day of the trade fair.

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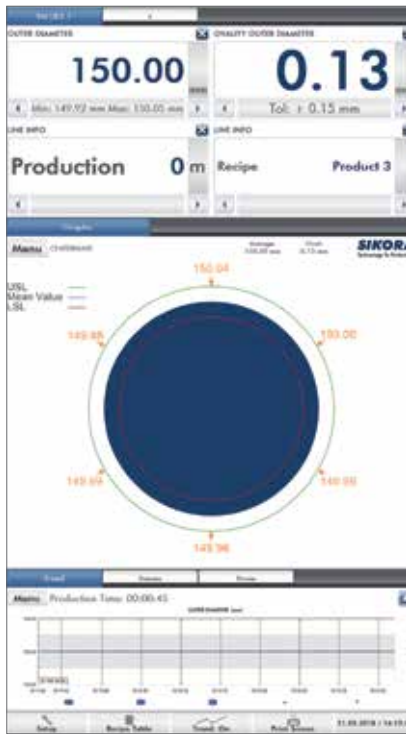
SIKORA presents RADAR SCAN 6000 at Tube China (E1B26)

Innovative radar technology measures diameter and ovality of metal tubes and pipes

At Tube China 2018 in Shanghai from 26 to 29 September, SIKORA will introduce RADAR SCAN 6000, which measures online and contactless the diameter and ovality of metal tubes and pipes. The system is based on progressive, high resolution radar technology and represents an innovative alternative to optical triangulation technology. In metal tube and pipe applications, the measurement is done simultaneously via transceivers from different directions over 360 degrees of the product circumference.

The advantages of radar technology, compared to optical measurement methods, are obvious: The measurement is carried out from a protected position and is resistant to heat, steam and dust. The system records to micron accuracy measuring values gapless, over the entire circumference of the product. In addition, fast rotating tubes and pipes can be precisely measured. The radar measuring system requires no calibration and delivers continuously precise measuring values, which results in high reliability and availability for the user. Due to the narrow design, RADAR SCAN 6000 can easily be integrated into the pro-





duction process. The technology reliably measures independent of surface roughness in typical tube applications. Therefore, it contributes to the highest product quality, process optimization and cost saving in tube and pipe manufacturing.

SIKORA was founded in 1973 and offers measuring, control, inspection, analysis and sorting technology for process optimization in the wire and cable, optical fiber, hose and tube as well as plastics industries. The company has now transferred the operator's advantages that result from using SIKORA measuring systems, with innovative and proven technologies to the metals markets. SIKORA

is headquartered in Bremen, Germany, where the technologies are developed and systems exclusively manufactured. With 250 employees worldwide, 14 offices and more than 30 regional representatives all over the world, the company provides customers with innovative product solutions and individual services at any time.

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SMS group GmbH

TMK-ARTROM starts production on new heat treatment line for pipes supplied by SMS group



Handshake between Simone Zussino (left), Vice President of Reheating Furnaces & Heat Treatment, SMS group S.p.A., and Adrian Popescu (right), CEO of TMK-ARTROM.

From left: Remus Nitu, Investment and Maintenance Director, TMK-ARTROM; Paolo Franz, Project Manager, SMS group S.p.A.; Francesco Zamproni, Site Manager, SMS group S.p.A.; Cristian Drinciu, COO of TMK-ARTROM; Jimmy Fabro, Head of Technical Department – Furnace Division, SMS group S.p.A.

In February 2018, after a successful test phase, TMK-ARTROM based in Slatina, Romania, granted SMS group the final acceptance certificate (FAC) for the supplied tube and pipe heat treatment line. Designed for an annual capacity of 160,000 tons, the new heat treatment line will be used for the production of seamless high-strength pipes up to a wall thickness of 60 millimeters for mechanical applications as well as of special OCTG pipes (oil country tubular goods).

During final acceptance testing, some very outstanding results were achieved: in particular, it was possible to quench a pipe of steel grade 4140 of 50 millimeters wall thickness, reaching 90 percent of martensite without generating any cracks in the pipe, as the ultrasonic test confirmed. Such result is enabled by the precision and

performance of the control system of SMS group quenching devices. According to TMK-ARTROM, currently no other pipe producer is able to reach these results with a water based-quench. "SMS group has confirmed its longstanding experience and reliability as a partner able to successfully deal with technological challenges like this commissioning at TMK-ARTROM," states Cristian Drinciu, COO of TMK-ARTROM.

The project mainly consisted of the supply of an austenitizing furnace with walking beam transport system, a cooling quenching head, a quenching tank, a walking beam tempering furnace and a cooling bed. The line allows carrying out various process steps, such as quenching, normalizing and tempering. SMS group also supplied a ten-roll straightening

machine arranged downstream of the tempering furnace, which guarantees straightening results of 0.9 millimeter per meter for the pipe end and 0.8 millimeter per meter for the pipe body. The column design and group drives are a proven design which allows easy maintenance and quick and easy tool changing.

The presence of two separate quenching systems makes this

heat treatment line extremely flexible. It features an outside sprayer primarily intended for small pipes and fast production rates and a special tank for processing the heavier-walled tubes. The quenching process for the various pipe sizes and grades had been simulated in advance with the SMS-Quench computational model in order to develop the process recipes that were later on

transferred to the control system of the real line.

The annealing furnaces are heated by eco-friendly, digitally controlled recuperative burners, which produce with very low nitrogen oxide (NOx) emissions in the furnace. These burners allow fuel savings of up to five percent compared to conventional burners.

SMS group GmbH

PQF® seamless tube production underway in advanced Texas plant

Tenaris has successfully started production at its seamless pipe mill in Bay City, Texas, about 80 miles southwest of Houston. The company invested a total of 1.8 billion dollars in the plant, located near the most active shale plays in the United States. The plant manufactures tempered oil country tubular goods for use in the production of natural gas and crude oil. The new PQF® tube mill, erected by SMS group, is designed to produce 600,000 tons per year precision seamless tubes with diameters of up to 9 5/8 inches.

The high-strength PQF® seamless tubes produced at the new mill are mainly used for casing applications as well as line pipe. With its Rig Direct® strategy, Tenaris is synchronizing its pipe manufacturing with customer drilling operations to reduce storage, maintenance and inspection costs.

High-quality tubes for the domestic oil and gas industry

In the past, the U.S. had to import a significant portion of the



tubes required for shale gas production from Asia and other parts of the world. "Our goal is to make the tube and pipe industry more effective and to drastically reduce imports for our market," says Germán Curá, President of Tenaris North America. Analysts and market experts see huge opportunities for success in the strategy being pursued by Tenaris, which

may also give the company a significant competitive advantage.

SMS group has worked very closely with Tenaris on the installation of state-of-the-art production technology for seamless tubes that satisfies the challenging requirements concerning both quality and tolerances as per API standards. Speaking of the new plant, Germán Curá goes on to say: "It



is the most advanced production facility in our industry worldwide.”

Close partnership for world’s most advanced tube plant

In 2008, SMS group erected a PQF® seamless tube plant for Tenaris at its mill in Mexico. Norbert Theelen, Head of Long Products at SMS group, adds: “We had already built a seven inches PQF® plant for Tenaris in Veracruz, Mexico. Building on our experience from this, our experts worked closely with the customer’s teams to set out objectives for the new plant and had already agreed their planned course of action during the engineering phase. There was intensive cooperation among all parties involved, that is, between Tenaris, our Tube and Pipe Plants division in Mönchengladbach, SMS Innse in Milan, and SMS Elotherm in Remscheid. We got together for regular steering committee meetings to ensure there was a continuous exchange of information and ideas. It was this close partnership that enabled us to meet Tenaris’s precise requirements.”

During the construction phase, an average of 1,400 skilled specialists, fitters, technicians, and

engineers were deployed on site, which covers an area of 110,000 square meters. The first pipe was rolled in October 2017, and the plant was officially inaugurated in December. Thanks to the very close proximity to the customer and the cooperative development of new plants and processes for new materials, SMS group is bringing its motto of “Leading Partner in the World of Metals” to life. The cooperation with Tenaris was an example of this.

SMS group supplied the plant technology and related engineering for its construction, and was responsible for the erection and commissioning supervision, including customer training. The main units of the PQF® plant include:

- Billet preparation section and saws
- Rotary hearth furnace
- Barrel-type piercing mill with Diescher disks, equipped for the first time with a hydraulic adjustment system
- PQF® rolling mill of BCO design
- Extracting mill

- Induction furnace for shell reheating
- 24-stand stretch reducing mill
- Cooling bed and batch layer saws

Cost efficiency thanks to extensive automation and maintenance-friendly design

Compared to previous industry standards, the new Tenaris plant is twice as efficient when it comes to high-quality seamless tube production. This is made possible thanks to, among other things, the high degree of automation and the use of robots, which convey the steel from one station to the next in a fully automatic process. Most of the crew works in the control room, in adjacent buildings, or below the production line, where they have easier access to the machine components for maintenance purposes. “Our process is fully automatic”, says Curá. In addition, every tube is given an identification mark, similar to a barcode, meaning the customer can trace the precise specifications using a scanner or smartphone.” In view of the challenging conditions in oil or gas fields, this smart means of tracing



tube documentation is making a significant contribution to total quality assurance.

To this end, SMS group has equipped the new PQF® seamless tube plant with a wide range of automated, state-of-the-art technology. Norbert Theelen from SMS group: "Our advanced level of digitization allows Tenaris to make substantial time savings and achieve optimum transparency as regards the current plant and production status. This is further enhanced by a host of other added value sources that boost efficiency levels. Tenaris is a trailblazer for modern plant and equipment that combine the benefits of digitization. For example, we have installed a secure WiFi network throughout the whole plant. This gives the operating crew access to information they need via mobile panels and to completely new ways of working."

The basis for the automation used at TenarisBayCity is provided by the CARTA® (Computer-Aided Rolling Technology Application) technology system, which is used as a technological production planning and process

control system for the entire hot rolling section of the seamless tube mill. CARTA® consists of three modules. The process-planning module prepares the rolling mill settings and the tool design. The process management module controls the rolling process in real time, and saves and analyzes the process data. The tool management module is responsible for the precise and timely use of the tools. So the benefits of CARTA® are numerous. This technology system offers not only increased output but enhanced tube quality and optimized mill utilization, too.

The measuring data used by CARTA® to monitor the quality are provided by systems such as CaliView®, which is supplied by SMS group. This is a newly developed inline system of measuring rolls and passes which are installed in the mill. A camera is used to take fast, precise and non-contact measurements of the stands inline, and to align them perfectly. Time-consuming, manual measurements are no longer required. CaliView® ensures there is direct feedback to a mobile

control device, meaning the rolls can be precisely adjusted during the measurement. What's more, the system detects wear on the work rolls and logs the data for producing informative statistics.

SMS group also implemented a holistic tracking solution for material and individual tube tracking. Production and quality-related tube parameters are measured at every machine during this process. The Identification Database software tool uses data gathering terminals (DGT) to collect the relevant information at each specified station and assigns this automatically to the tube number.

The system provides production and quality reports in real time, statistical reports for identifying quality-related problems or production bottlenecks, and a comprehensive database for developing production and process know-how.

It is not just the tubes and production processes that are continuously tracked, the tools are too, especially the mill stands and mandrels, and for this they are equipped with around 850 chips and are monitored throughout with a fully automatic tool tracking system with RFID technology. In addition to this, Tenaris also has a comprehensive condition monitoring system for the main drives, gears, motors, and saws. This online monitoring system is used in particular for monitoring parts that optimize preventive maintenance, increase the plant's availability, and reduce operating costs.



Modern, eco-friendly workstations

The building is eight stories higher than usual and this improves the airflow inside the building and creates a pleasant, climate-controlled working environment. Ninety-five percent of the waste materials created during production are to be recycled on site, according to Tenaris. And this makes Tenaris not only one of the most advanced but also the most sustainable tube mills in the world. The United States Environmental Protection Agency has categorized the new Tenaris plant as a “minor source of emissions”.

Technical data

Annual capacity: 600,000 tons of seamless tubes

Tube diameter: between 4 1/2" (114.3 mm) and 9 5/8" (244.5 mm)

Tube wall thickness: between 5.7 and 25.4 mm

Product range: OCTG tubes as per API, carbon steels, low alloy and high-alloy steels with a chromium content of up to 9 % and 13 % respectively.

SMS group GmbH

TBK Automatisierung und Messtechnik GmbH is a 100-percent subsidiary of SMS group now



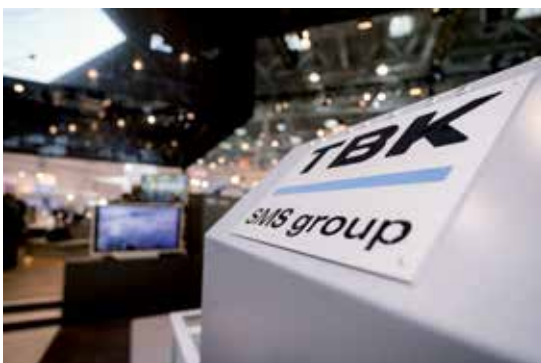
Customized solutions for dimension control and surface analysis of rolled products from one source

For some years now, SMS group has been holding a share in TBK Automatisierung und Messtechnik GmbH, domiciled in Graz, Austria. The remaining business shares were acquired with retroactive effect from January 1, 2018, which means that TBK is a 100-percent subsidiary of SMS Beteiligungs-GmbH now.

TBK Automatisierung und Messtechnik GmbH has been developing measurement technology solutions for the steel industry since 1986, in particular laser measuring systems using the light section method. The two companies TBK and SMS group have been cooperating closely since 2004. Jointly, they offer tailor-made solutions for dimension control and surface analysis of rolled

products for all tube and pipe, wire rod and bar as well as section mills included in the portfolio of SMS group. Straightness measuring equipment, especially for rails, and instruments for measuring special profiles and wheels complete the product range.

Using measuring systems from TBK, producers will be able to continuously monitor their products for surface defects fully automatically and during ongoing production. For this purpose, an analyzing model composes the high-resolution measurements to form a three-dimensional model. High measurement frequencies stand for the necessary precision: Providing up to 5,000 scans per second, the system shows even finest surface irregularities. High sampling rates, different laser colors and absolute synchronization are features that distinguish TBK sensors from other



light section sensors. These properties ensure the highest accuracy and a detailed image of the current product quality, even with fast-moving or strongly vibrating material.

The continuous advancement of the systems is not only an important factor of success, but also the basic philosophy of TBK. The development in the fields of laser and information technology as well as in the analysis of surface to determine the surface condition will remain the basis of TBK's measurement systems also in the future.

The company founder, Heinz Kotzmuth, passed on responsibility for the management to the two managing directors Ralf Kremer and Ulrich Svejksky, but will be available to provide advisory support.

The harsh conditions in steel processing plants pose a huge challenge to measuring technology. Measurement systems made by TBK have matured through years of experience and stand out due to high thermal and mechanical stability. This stability is of crucial importance for the consistency of the measured data and also for the quality of the derived parameters. Further, closed-loop controls have been developed in cooperation with SMS for automatic roll setting to the required adjustment values based on the measurement results. TBK adapts its measurement technology to the customer's requirements and prepares tailor-made solutions, if so desired.

TBK's core competence is the continuous monitoring of ongoing production processes with focus on the use of tried and tested laser technology. Contactless precision measurements visualize production processes and permit statistical process controls to be made in a number of variants. TBK's activities and services are characterized by the highest degree of flexibility and customer-orientation. The inhouse focus is on research and development work in the field of contactless, laser-based contour measurement for numerous sectors within the steel industry.

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TRACTO-TECHNIK GmbH & Co. KG

Tube manufacturing with system

Independently of food, beverage or pharmaceutical industries, chemicals, bio-technique or air conditioning, at the shipyard, on a power plant construction site or in hydraulic systems: for many applications tubes and pipes – at a high standard of quality, exactly formed and machined – are key products for successful market presence. Manufacturing of sophisticated customer-specific pipework in large quantities at

competitive prizes on the quality level of standard products represents a serious challenge. Thus, for a superior and economic fabrication of complex tube and pipe geometries intelligent manufacturing solutions are required: the modular extensible manufacturing system from the PIPE BENDING SYSTEMS (PBS) division TRACTO-TECHNIK supports the workflow of tubes and pipes in an efficient and flexible manner. The modules of the system – bending machine, measuring technique and software – cooperate in a unique way.

Dr. Christian Gerlach, head of business area of PBS, explains: „Numerous excellent examples of the implantation of our efficient system can be seen in the field of high-priced, high quality tube production for machines for special applications. Rarely a tube geometry appears twice, most of them are unique – finally one-of-a-kind products. Today one of the most important manufacturers of food processing lines worldwide produces the tubes for the daily assembly of his apparatuses nearly just in time (during the year, in one single plant several hundred kilometres of tubes are installed). Of course each bend or elbow must be suitable.”

The workflow of the system is managed by a software module named PIPEFAB: beginning at the supply of the pipe from the high-rack, followed by the machining operations – marking, sawing, bending, deburring, welding – up to the finished part. „If the customer owns several plants, PIPEFAB is able to propose the

actually most efficient site for the production of each part on the whole globe. Already now we of TRACTO-TECHNIK create the basis for global applications of digital engineering and manufacturing of piping network within the meaning of Industry 4.0. Our system applies independently of installing connecting pipes or manufacturing manually or automatically in the workshop” resumes Dr. Gerlach.

Tracto Technik – Pipe Bending Systems

Since more than 50 years we develop and manufacture sustainable and innovative machines, precise measuring systems and intelligent software solutions for the manufacturing of tubes and pipes. Thus, in the course of time a unique system for efficient tube production has been created. PIPE BENDING SYSTEMS offers the best solution if it comes to individual parts and small series production with high product variance. Here you can also figure out our core competence: Thinking about solutions in the area of tube manufacturing.



Sophisticated economic production: One-of-a-kind parts for special machines assembly – the first tube segment must be suitable.



Dr.-Ing. Christian Gerlach, Head of business area TRACTO-TECHNIK GmbH & Co. KG, PIPE BENDING SYSTEMS: „Our system modules assist the workflow in a unique way.”

TRACTO-TECHNIK GmbH & Co. KG - PIPE BENDING SYSTEMS

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Vallourec Deutschland GmbH

Partnership project with Interpipe

Vallourec, world leader in premium tubular solutions, and Interpipe, Ukrainian manufacturer of steel seamless tubes, announce their intention to start a partnership to produce in cooperation non-OCTG[1] carbon seamless tubes for the European market.

These products, mostly for mechanical, line pipe and process applications[2], will be produced by Interpipe before being conditioned and controlled in a finishing line to be implemented in one of Interpipe's mills located

in Nikopol city in Ukraine and managed by Vallourec. The start of production is planned for autumn 2018. These tubes will be commercialized by Vallourec in Europe.

With this partnership, Vallourec will be able to complement its offer with highly competitive entry-level pipes and therefore propose a global portfolio of solutions to reinforce its market position in Europe, the Group's historic base currently positioned on products with higher added value.

Vallourec to supply Framatome with steam generator tubes for the new Hinkley Point C EPRs

Vallourec, world leader in premium tubular solutions, announces that its subsidiary Valinox Nucléaire SAS, specializing in the production of tubes for nuclear power plants, has signed a major contract with Framatome for the manufacture of more than 47,500 tubes for the 8 steam generators of the two new EPR Hinkley Point C units located in England.

"This contract once again shows Vallourec's expertise as a key partner in the French nuclear industry and testifies to the solidity of our long-standing collaboration with Framatome," said Philippe Crouzet, Chairman of the Management Board.

These tubes supplied by Valinox Nucléaire-the only interface between the primary system and the secondary system in pressurized water reactors-transfer heat from the reactor to the secondary loop in order to produce steam that drives a higher power turbine generating electricity.

As critical components in a nuclear power plant, these tubes contribute to the safety of the facility and their quality is an important element in ensuring reactor performance. "These tubes comply with the strictest nuclear safety standards," said Stéphane Jeanneteau, President of Valinox Nucléaire.

Production of this 1,000 km order will begin in 2018 at the Group's Montbard site (Burgundy, France),

which has over 40 years of experience in this highly technical field. Based in France and China for its nuclear activities, Vallourec is involved in nuclear projects throughout the world and covers all its customers' needs with a complete range of premium tubes, in terms of both dimensions and steel grades.

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Vallourec Deutschland GmbH

Vallourec renews and reinforces its collaboration with Petrobras by signing new long-term agreements

Vallourec, world leader in premium tubular solutions, today announces it has signed new contracts for the supply of products and services to the Brazilian national oil company Petrobras.

In the framework of these 3 years Long Term Agreements, Vallourec will supply Petrobras' operations with premium seamless OCTG products and associated accessories, with premium steel grades and connections using state-of-the-art technology, and specialized services.

The products and associated services will be used by Petrobras on its offshore Oil & Gas exploration and production wells, located at the important reservoirs of the pre-salt basin. The Petrobras production coming out from pre-salt area already represents more than 50% of Petrobras total production.

With these contracts, Vallourec consolidates its worldwide leadership in the supply of premium OCTG products for the Oil & Gas industry. Philippe Crouzet, Chairman of Vallourec's Management Board, declared: "Petrobras is one of the most productive oil companies in the world and oper-

ates in pre-salt areas where the potential is huge. We are proud to have taken up the challenge once again, to answer the technological challenges of Petrobras. We are pleased to pursue our collaboration with this historical partner. We have been bold in supporting it with the best of our innovation and by proposing new services".

Huge technical challenges ahead

The Brazilian pre-salt fields combine several challenges besides the salt layer itself: well depths up to 7,000 meters, ultra-deepwater conditions with up to 2,000 meters between surface and seabed, acid corrosion caused by H₂S and CO₂ contaminants, temperatures and pressures tending toward High Pressure/High Temperature conditions in certain areas. Associating all these parameters together has an important impact on the exploration models, and on the requirements for OCTG products able to withstand such a combination of mechanical, corrosive and thermal constraints.

Vallourec, through its sustained innovation capability, is able

to meet all these technological needs and will supply Petrobras with the most advanced seamless pipes for sour service using high alloyed material as well as the latest and unequalled advanced premium connections. Further on, specialized technical services have been developed over the last years in order to answer to new needs from our customer.

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Xiris Automation Inc.

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www.xiris.com

Xiris Automation Inc. is pleased to announce the establishment of a German subsidiary and opening of a European sales and service office in Ratingen, Germany, near Dusseldorf.

In order to better support our growing customer base in Europe, the sales and service office is just one more way Xiris can ensure its European customers continue to be well supported. As part of this initiative, Xiris is now able to offer annual recertification services of our weld inspection systems used in the tube industry

from the Ratingen office, helping customers achieve optimal equipment performance and drive quality assurance.

Xiris Automation Inc. specializes in developing optical equipment used for process and quality control across a number of specialty industries. With an extensive product line, Xiris provides some of the world's most dynamic manufacturers with the ability to detect, recognize, and interpret quality defects in their manufactured goods.

Xiris Appoints Turkish Representative



Xiris Automation is pleased to announce that Pruftechnik STI has been appointed as its exclusive Distributor of Xiris products for both the Metal Fabrication and Tube & Pipe industries for Turkey.

Pruftechnik STI is a sales representative of non-destructive test equipment for the tube industry and other metal working fields. Providing turnkey sales and after sales service and training, Pruftechnik will be able to distribute and support the Xiris WI2000/3000 Post Weld Inspection Systems, used to detect quality issues related to the tube welding and forming process.

For many years Pruftechnik STI has been working with a competent staff who have gained experience in production, quality and sales of metal fabrication equipment with an aim to provide their customers with the best technical solutions available on the market. In entering into this relationship with Pruftechnik, Cameron Serles, President of Xiris Automation

explains, "We are excited to work with an excellent partner who has many years of experience in the tube market in Turkey, combining operations experience with extensive test equipment knowledge. They share our values of a high level of commitment to ensuring customer satisfaction and continuous improvement of technical knowledge."

Xiris Automation Inc. specializes in developing optical equipment used for process and quality control across a number of specialty industries. With an extensive product line, Xiris provides some of the world's most dynamic manufacturers with the ability to detect, recognize, and interpret quality defects in their manufactured goods.

Zumbach Electronic AG

In-line Complex Profile Measurement and Monitoring, PROFILEMASTER® Systems from ZUMBACH

As a pioneer of on-line measurement committed to extensive research and development activities, ZUMBACH Electronics has continuously grown as one of the world-wide leading manufacturers of in-line measuring and control systems. Top priority at ZUMBACH Electronics remains to be customer relationships through local presence combined with proven high-quality products, services, personal consulting and support. ZUMBACH's PROFILEMASTER® systems are developed from a core set of proprietary mega pixel camera/laser modules and software technologies. The application of these technologies has been adapted to serve specific measurement, monitoring and surface flaw detection needs for; extruded plastic and rubber tubes, hoses, profiles, wire and cable, wood, plastic composites, steel rod, bar, profiles and much more.

Depending on the customer application and product dimension, ZUMBACH offers a full range of PROFILEMASTER® gauges, including models for small precision profiles starting from a dimension of 0.5 mm (.02 in.), cold formed tubes and profiles as well as medium size products, hot or cold, up to dimensions of 600 mm (23.6 in.)

PROFILEMASTER® systems are available with 1 up to 8 laser/camera modules measuring continuously the cross section of the moving profile. A powerful

PC-based processor combines the captured line images of the individual cameras to yield the momentary cross-section of the profile. All relevant dimensions such as width, height, angle and radius or other geometric quantities are computed to characterize the full cross-sectional picture. An operator-friendly graphic display of this data allows the product to be monitored during the production. The nominal values for the profile can be directly imported from CAD design files, which allows easy and problem free configuration of the device. Changes in speed and twist within normal limits have no influence on the measurement precision.

Customer Benefits / Main Features

- Provides 100% inspection in real time
- Reduces start-up time
- Increases the repeatability and precision of your end product
- Improves process control
- Reduces scrap
- Saves raw material and post processing costs
- Detects process problems at an early stage
- Integrates in a seamless way to your network or higher-level systems
- Simple cleaning requirements, giving short maintenance needs
- Logging of all production data for QC department



PROFILEMASTER® SPS 80 measuring unit

- Makes post production measurements irrelevant
- Surface fault detection (SFD) thanks to high sampling rate
- Compilation of a 3D model thanks to high sampling rate
- Reliable operation in harsh conditions, product temperatures up to 1200° C

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Selection of ODAC TRIO measuring heads.

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Diameter Scanner and Flaw Detector in One Unit ZUMBACH, pioneer of on-line measurement and its triple axis ODAC TRIO laser diameter gauges belong to the market leaders of super fast diameter measuring devices. 3 synchronized measurement axis in 1 single plane provide comprehensive measurement coverage, peak-precision diameter and ovality measurement as well as precise and super-fast flaw detection capabilities. Such combinations will help to reduce system costs due to the combination of diameter measurement and flaw detection into one single measuring device. Optimum process control in continuous manufacturing processes are guaranteed thanks to highest precision and reliability. The combination of super fast scan

rates, highly precise and reliable measurement contribute to the reduction of scrap and production costs: your manufacturing process remains profitable all along.

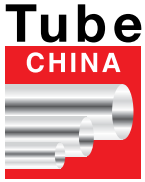
Thanks to the compact design, the ODAC TRIO measuring heads can be used in virtually every manufacturing process in the wire and cable industry, the plastics and rubber industry as well as the steel and metal industry. Known for precision, quality and ease of use the laser measuring heads from ZUMBACH are among the best of their class. The technological basis considered for these measuring heads is always of the latest cutting edge technology, with laser diodes as light sources combined with intelligent and powerful measured-value processors which facilitate a simple and flexible integration.

Main Advantages

- 9000 measurements per second
- 3 synchronized measurement axes on 1 single plane
- Reliable detection of the ovality
- Yields highly accurate mean value, regardless of the orientation of the product ovality
- Increased measurement accuracy and reliability
- High dirt and dust tolerance
- Amongst the outstanding features are features such as single scan calibration (CSS), single scan monitoring and high data rate output of up to 200* data packages per second. The measuring heads can be used with all line speeds. Vibrations during production have no noticeable influence on measurements.

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wire 2018 and Tube 2018: order intake at wire, cable and tube trade fairs as good as in years



Investment has gone up worldwide – in infrastructure, the automotive sector, the electrical industry, regenerative energy projects and in oil and gas pipelines. And the upstream supplies industries wire, cable and pipes have substantially benefited from this development at the international No.1 trade fairs wire and Tube in Düsseldorf from 16 to 20 April 2018.

Across Germany steel and metal processing counts among the ten mayor sectors of industry. These sectors are strongly characterised by SMEs, by traditional growth and innovation. But even major groups of companies are now re-aligning their operations, following digital optimisation processes and reorganising their distribution channels, both nationally and internationally.

“As trade fair organisers we have once again succeeded in offering the wire, cable and pipe industries a global platform in Düsseldorf as a Basis for Business,” delighted Joachim Schäfer, Managing Director at Messe Düsseldorf GmbH,

after five successful days at the trade fair.

Orders for capital goods like machinery, plants and vehicles are very high and the German economy is very much benefiting from the positive global business climate. More than 71,500 trade visitors (compared to 69,500 in 2016) from 134 countries came to Düsseldorf over the five days to find out about industry innovations and conclude business deals at the world’s No. 1 trade fairs wire, the international wire and cable fair, and Tube, the international pipe and tube fair.

A total of 2,683 companies from 67 countries presented their technology highlights in 16 exhibition halls on more than 117,000 square metres – some 7,000 square metres of space more than at the previous events in 2016!

Being the internationally leading communication and business platforms for their respective sectors participation in these two international top trade fairs is a must for all industry players. The steel and NF metal industries have always been reliable early indicators for all other industries – if things go well here, the economy as a whole will benefit.

wire 2018

Wire and cable machines, wire and cable production, trade with these materials as well as fibre glass technologies, mesh welding machinery, spring making, fastener technologies and the China

Pavilion meet china’s expertise were presented in exhibition halls 9 to 16. A total of 1,442 exhibitors from 53 countries showcased their innovations on space exceeding 65,000 square metres.

Most wire exhibitors came from the major producer countries Italy, Germany, Turkey, Great Britain, France, Spain, Austria, the Netherlands and Switzerland. From overseas many exhibitors from the USA, India, Taiwan, South Korea and China travelled to the exhibition halls on the Rhine.

“wire and Tube in Düsseldorf once more proved this year that they are the most important events in the industry worldwide,” rejoiced Dr.- Ing. Uwe-Peter Weigmann, member of the board and spokes-person at WAFIOS AG, and went on to say: “It never ceases to impress us how these events bring an expert audience and customers from all over the world to the Rhine. For WAFIOS we can report that we posted a multitude of interesting, concrete project talks and closed numerous deals. We look forward to being back in 2020.”

Tube 2018

The ranges at Tube 2018 encompassed pipe and tube materials, manufacturing, finishing, processing, pipe and tube accessories, trade and forming technology including profiles, plastic tubes, machinery and plants as well as the China Pavilion meet china’s expertise. Tube was held in Halls

3 to 7a, 7.0 and 16 to 18 occupying in excess of 52,000 square metres of exhibition space. 1,241 companies from 57 countries were presented.

Underscoring the international relevance of Tube, Bernhard Kleinermann, press spokesman at Salzgitter AG, said: "The Salzgitter Group presented its international pipe activities under the claim "Mannesmann. Das Rohr." at Tube 2018. The positive re-sponse as well as the indepth conversations with customers and partners from both home and abroad have showed us once again that Tube is the most important communication platform for the steel pipe sector." The industry insider went on to say: "The Business Unit Mannesmann with its tradition-rich brand name will also be a key exhibitor at this leading trade fair in two years' time."

At Tube most exhibitors hailed from Italy, Germany, Turkey, Spain, the Netherlands, Great Britain, Switzerland, Austria and France. Most overseas exhibitors travelled from the USA, China, India, South Korea and Taiwan to Düsseldorf.

Summary after Five Trade Fair Days:

The visitors at wire 2018 and Tube 2018 were very international boasting great professional expertise while promising customer contacts and good postfair business prospects determined the atmosphere at the stands. Over 50% of visitors of both trade fairs came with concrete investment intentions. 70% of visitors were executives with high decision-making authority.

Trade visitors at wire 2018 were primarily interested in machines for processing and producing wire

and cable, steel bars and strips, process engineering tools as well as machines, equipment, tools and auxiliaries. The forming technology and auxiliary materials segments were also in high demand. 20% of the visitors polled stated they were interested in finished products.

Pipe, tubes and accessories, raw materials, machines for producing, finishing and processing pipes, profiles and companies trading with all kinds of tubes met with the highest interest among trade visitors at Tube 2018.

Trade visitors at both trade fairs rated the two No.1 trade fairs as outstanding. Over the five days in excess of 71,500 trade visitors from 134 countries came to Düsseldorf. 70% of trade fair guests came from abroad and one third of these from overseas. 55% of trade fair visitors voiced their satisfaction at having found new suppliers.

30 March to 3 April 2020 will see wire and Tube held again together at the Düsseldorf exhibition centre. For current information on both trade fairs visit the internet portals at www.wire.de and www.Tube.de.

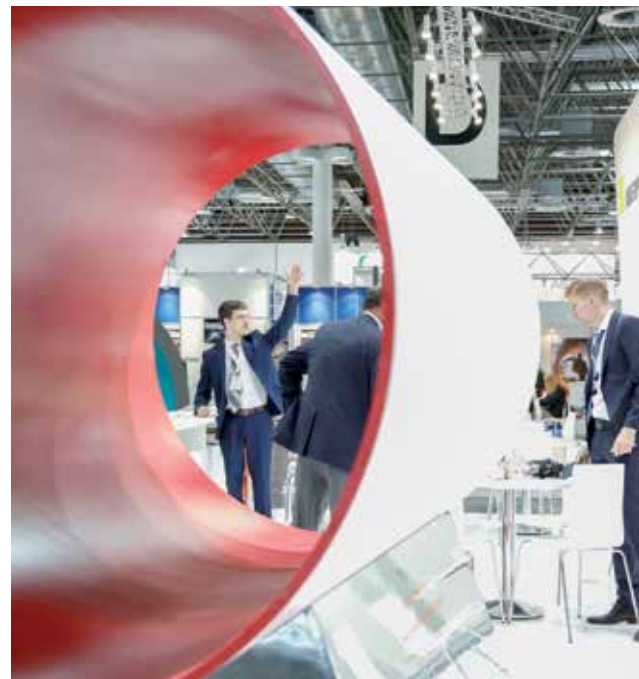
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ITA e.V.

The ITA Convenes the 39th AGM at Tube 2018 in Düsseldorf



Being an organisation with members spread all over the world brings with it very specific challenges when there's a need for members to convene to conduct Association business. That's why we take advantage of opportunities that other events offer us to do so.

The AGM is a case in point and, as often, this year we met at a fair: The 39th Annual General Meeting of the International Tube Association took place on 19 April, 2018, during this year's Tube fair, at a venue within Messe Düsseldorf grounds in Germany.

After establishing quorum, the usual business of the AGM went ahead, including the Annual Reports by the Chairman and the Technical Committee.

The annual accounts report was presented and unanimously approved, and Dr.Günther Voswinckel (President) informed members of the decision, taken by the IEMB (International Executive Management

Board), to increase membership fees from June 2018.

The high point of the meeting was doubtless the presentation of the Technical Paper Award. Every two years during Tube Düsseldorf, the ITA recognizes the important contribution that is made by speakers at its technical conferences held since the previous exhibition and selects one outstanding paper for the Award.

This year's Award was presented to M. Marc Choquet, VP Laser NDE, of Tecnar Automation Ltée in Quebec, Canada, for his presentation, "Novel Signal Processing Of On-line Wall Thickness Gauge Profiles For Production Monitoring Of Hot Seamless Steel Tube Plants". (See the Technical Committee report.)

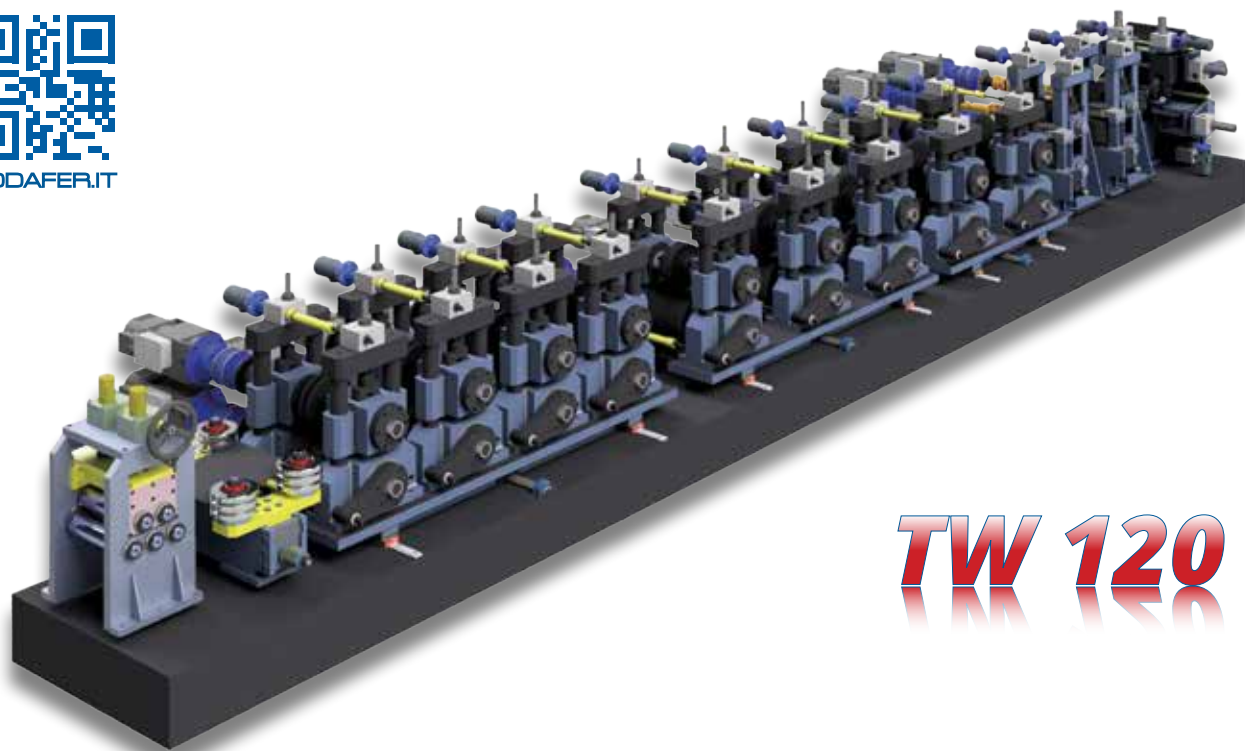
Some upcoming events fell under the heading of 'Any Other Business' and the meeting was wrapped up with members looking forward to an informal chat, the usual business of a trade fair, and an 'after-party' at the ITA booth.



International Tube Association e.V.

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- » extremely easy to use.

Review: ITA Booth Party at Tube 2018

ITA e.V.

An Invitation Accepted



Since a trade fair represents a rare opportunity, for an international Association such as the ITA, for members from all over the world to come together in the same place, it doesn't take much of an excuse to have a party. Following this year's AGM, which we convened during the Tube 2018 expo in Düsseldorf in April, the ITA invited attendees to an informal booth party which took place at our booth in hall 4.

Experience has shown that this is a great opportunity to meet up

with fellow ITA members and the Officers of the Association. The ITA laid on the music, and around 80 guests took us up on our offer of free snacks and refreshments (both alcoholic and non-alcoholic) and the chance to meet with friends and colleagues and talk shop for an hour or two.

We'd like to thank everyone who came and hope to see you again soon at a similar event, whether in China, Russia, the US, or heaven knows where!



ITA e.V.

Focused on the Future – Tube 2018 Students’ Day with the ITA

It’s the world’s biggest and most important trade fair for the tube and tube processing industry. Tube 2018 took place at the Düsseldorf exhibition grounds in April 2018, and the organisers reported an increase in both exhibitor and visitor numbers compared to 2016.

Given the event’s significance for the industry as a whole, the International Tube Association decided to specifically address the entrepreneurs, experts and innovators of tomorrow and to get them on the same stage with the employers and enablers of today.

This year for the first time, the ITA issued an invitation to machining and forming technology students and faculty members from around the country. The students were invited to attend the exhibition on April 20, 2018, for a day which included a guided tour of the halls and a chance to meet some of the participants at their booths.

Exhibitors were likewise encouraged to grasp the opportunity to participate in the tour and give the students an opportunity to talk to a representative from the company.

For our very first Students’ Day – our pilot project, so to speak – we were delighted to welcome 10 research students from various faculties, and to be able to take them to meet experienced professionals from the following companies:

- Aperam Stainless Services & Solutions Germany GmbH
- Foerster Holding GmbH
- Gräbener Maschinentechnik GmbH & Co. KG
- IMS Messsysteme GmbH
- Mannesmann Stainless Tubes GmbH
- Olimpia 80 srl
- SEUTHE GmbH
- data M Sheet Metal Solutions GmbH
- SMS group GmbH
- Erciyas Pipe

This is a win-win initiative. The students profit from the experience and knowledge of well-established names; the hosts have the opportunity to collaborate on research that could point the way to the next breakthrough in the sector.

Ideas find resources.

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This is truly networking with the future, and this is why we aim to make it a permanent fixture at the Düsseldorf Tube fair. Watch this space.

International Tube Association e.V.

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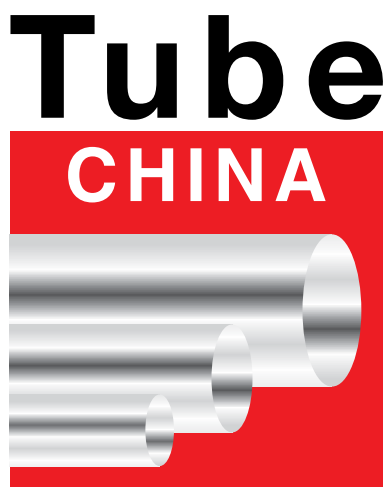
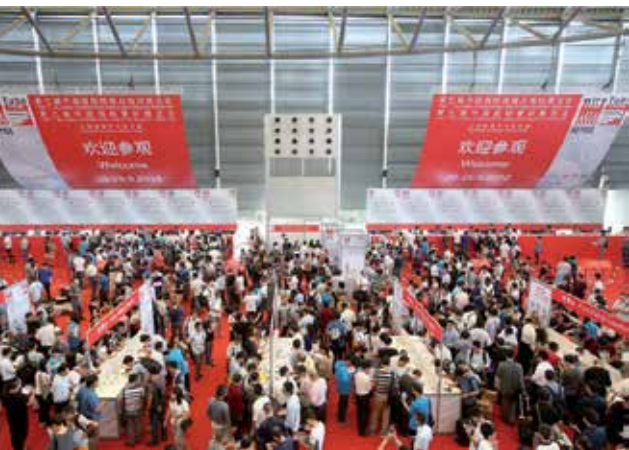
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Messe Düsseldorf GmbH

Tube China 2018 with innovative technology highlights



From 26 to 29 September 2018 the Shanghai New International Expo Center (SNIEC) will be opening its gates for Tube China 2018, the biggest industry trade fair in pipe and tube processing technology in Asia.

The event is organised by Messe Düsseldorf, Messe Düsseldorf China and their Chinese partner, MC-CCPIT (the Metallurgical Council of the China Council for the Promotion of International Trade), who are pleased about the ongoing growth of the event.

Tube China will be held in parallel with wire China, the leading Asian trade fair for the wire and cable industry. In all, over 1,600 exhibitors from 30 countries will be presenting their technological innovations at the two trade fairs. The organisers are expecting to see 40,000 trade visitors on the four days of the event.

The high quality of the trade fairs is reflected by the large number of market leaders that are taking part again, wanting to continue their success achieved so far. They include well-known companies such as Fischer Edelstahlrohre, Kinkelder, Tectubi, Wecotech, Stappert, Sandvik and Linsinger Maschinenbau.

As well as several European market leaders, Tube China will have a German pavilion, supported by the German Ministry for Economic Affairs and Energy. This stand has grown significantly by around 80% this year. The German pavilion will feature companies such as Reika GmbH, Trumpf, Sikora AG, Felss Group, Transfluid Maschinenbau, Thermatool and Lang Tube Tec GmbH.

The strong economy in the Asian market has inspired companies to increase their presence at Tube China, the second biggest regional industry event after the leading trade fair, Tube, in Düsseldorf. After all, exhibitors at Tube China have long discovered a range of Chinese markets for themselves: water, wastewater, power stations, the chemical industry, pipelines and energy.

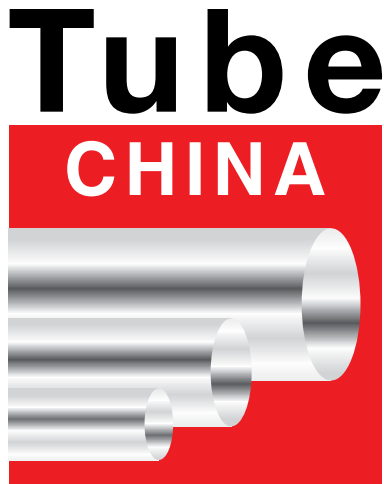
See the website for further details: www.tubechina.net/en/

Your contact in Düsseldorf: Marcus Müllers at MuellersM@messe-duesseldorf.de or +49 211 4560 579.

Your contact in Shanghai: Mary Cao at mary.cao@mds.cn.

Messe Düsseldorf GmbH

Tube & Pipe Industry Development Seminar 2018 – Updated with More Exciting Topics Unveiled



A Number of Technical Forums Will Be Held Simultaneously to Focus on Trending Issues and Difficulties in The Development of The Industry

Thanks to the success of the first seminar, the organizers have planned to extend the second edition of the “Tube & Pipe Industry Development Seminar 2018” to a two-day event. The organizers, Metallurgical Council of the China Council for the Promotion of International Trade and Messe Dusseldorf (Shanghai) Co., Ltd.

will continue to join hands with ITA - International Tube Association to invite well-known industry experts and professional users from home and abroad to conduct in-depth analysis on trending topics such as market status, development and application of steel pipes and welded pipes, etc.

- Seminar date: September 26 - 27, 2018
- Seminar location: Hall E1 “Tech Stage” (Booth No.: E1-G24), Shanghai New International Expo Center, China.

Topics Preview

Day 1 / September 26, 2018 (Wednesday)

- Introduction on Global Tube Market
- Chinese Pipe and Tube Industry Status and Supply-Demand Development
- Analysis of World Economic Situation and Oil-Gas Exploration Situation

- Overall Situation of City Underground Pipeline and Demand Analysis
- How to Get Back to Profit with Future-Oriented Solutions for Competitive Tube Plants
- 3-D Surface Inspection in Production of Seamless Tube
- High-Performance Production Cell for Premium Coupling Blanks
- Tube E-commerce Development

Day 2 / September 27, 2018 (Thursday)

- Prospect of High-End Stainless Steel Tube and Market Demand
- The Buildup of Steel Pipe Standard System and the Speedup of Industrial Restructuring
- Present Status and Development of International Top Pipe Companies





- Development of China Welded Pipe Industry
- Innovative Radar Technology for Online Quality Control of Tubes and Pipes
- COPRA® ProfileScan Desktop – Quality Control for a Sustainable Competitive Advantage
- Research on Springback Mechanism and Intelligent Control of Ultra High Strength in Roll Forming Process

Info. updated as of June 25, 2018. Please refer to the schedule onsite for the final list of topics.

The seminar is open free of charge to professionals. Follow this link for online registration to reserve your seat! (<http://wirutubechinaforum.mikecrm.com/FpWrrMm>)

Forum on Fastener Application to Offshore Wind Power and Marine Equipment Industry is Open for Audience Registration!

As an emerging industry, offshore wind power and marine equipment have developed rapidly in

recent years. Major countries have invested a lot of energy and resources in the development and application of these two fields. As a very important accessory to connecting these mammoth industries, high-quality fasteners with different properties becomes an essential element.

Screws, bolts, and nuts in fasteners look small, but they play a crucial role in high-profile industries such as aerospace, marine equipment, offshore wind power, utilities, and power plants. In order to comply with the development trend of offshore wind power and marine equipment industry, Shanghai Fasteners & Tech Show has joined hands with www.ishipoffshore.com, and plans to conduct the “Forum on Fastener Application to Offshore Wind Power and Marine Equipment Industry” during Shanghai Fasteners & Tech Show 2018 (September 26-29).

- Forum date: September 28, 2018

- Forum location: G50 Forum Area, Hall E4, Shanghai New International Expo Center, China.

At the forum, mainstream owners, builders, supporting companies, design companies and service organizations in the offshore wind power and marine equipment industry at home and abroad will discuss the current status, prospects, challenges and opportunities for the use of fasteners in shipbuilding, offshore wind power and marine equipment industry. All industry experts are welcome to participate in this grand event!

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www.tubechina.net

Preview: Tube china 2018

The forum is free for professionals. Please follow this link to register:

<http://wirutubechinaforum.mikecrm.com/6Sa-JunK?iro=1>

“Automobile Fastener Premier Forum 2018” Connects Upstream and Downstream Companies in The Industry

Automobile Fastener Premier Forum 2018, collocated with Fastener Shanghai, aims to connect fastener manufacturers and downstream vehicle manufacturers. They will discuss and launch new products, new technologies, and new trends in the production of automotive fasteners. It is confirmed that Mr. Jiao Junhua, General Manager of Dongfeng Automobile Fasteners Co., Ltd., a subsidiary of Dongfeng Group, will deliver a speech on “New Energy Automotive Fastening Technology”. In addition, there are more technical experts from well-known car companies who will participate in the event. Stay tuned!

- Forum date: September 27, 2018
- Forum location: G50 Forum Area, Hall E4, Shanghai New International Expo Center, China.

The forum is free for professionals. Please follow this link to register: <http://visitor.fastenertradeshows.net/Visitor/en/register.aspx>

Visitor pre-registration is open – register now win 5-star accommodations!

The biennial wire & Tube China is among the most pivotal gatherings of industry professionals, with an estimated 46,000 professional visitors from 95 countries and regions in attendance. Whether you’ve come to source, search for partnerships or familiarize yourself with the Chinese market; you won’t be disappointed at wire & Tube China 2018.

How to pre-register?

Visitors may visit the official websites of wire China (www.wirechina.net), Tube China (www.tubechina.net) and Fastener Shanghai (www.fastenertradeshows.net) to register before arriving. You will receive a confirmation letter with your register code to claim your badge at the ‘Pre-Registered Visitor’ counter onsite.

One lucky visitor will be chosen by random to receive a one-night stay in Shanghai during the show dates! representing 50 countries. Over 65,000 sqm are occupied in Halls 9 to 18. The occupancy level for Tube in Halls 3 to 7.0, 7a and 16 to 18 is over 52,000 sqm, with 965 exhibitors from 53 countries.

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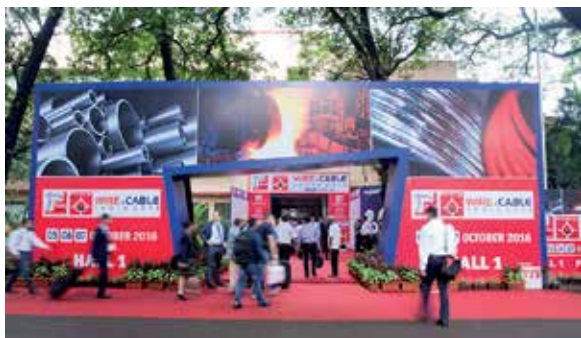
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Powerful Metal Trade Fair Trio on the Indian Subcontinent: wire India, Tube India and Metallurgy India



27 to 29 November 2018 will see the Indian trade fair trio wire India, Tube India and Metallurgy India held at the Bombay Convention & Exhibition Centre in Mumbai for the seventh time now. The concurrent holding of the three trade fairs generates valuable synergies for both exhibitors and visitors.

Machines and equipment, latest technologies and services in the areas of wire and cable production, tube and pipe production, pipe processing and metallurgy will be presented over the three trade fair days.

The exhibitors at wire India showcase machinery and equipment for wire making and finishing, forming technology, spring making, cable and strand machines, tools and auxiliaries for process engineering, measuring and control technologies, all types of wires (rolled wire, bare wire, special wires) cable and sheet metal.

For the first time the exhibitors of fastener technology will also be presented with their own special show, the "Fastener Special Zone", in India. With this new feature wire India responds to the growing interest voiced by the industry.

The exhibits at Tube India range from tube and pipe manufacturing through pipe finishing to pipe processing, including raw materials, pipes and pipe accessories, pipe

trade, pipe-production machinery, second-hand machinery, tools for process engineering, auxiliaries, measuring, control and testing technology.

The entire metallurgical industry segment complete with electrical and automation equipment will be on show at Metallurgy India.

The trade fair trio will again be organised by Messe Düsseldorf together with Messe Düsseldorf India. Approximately 400 exhibitors from 25 countries are expected.

Alongside many Indian exhibitors and companies from neighbouring countries there are big country participations from Italy, Austria, the USA, China and Germany.

A strong demand in the Indian automotive industry, construction sector and the energy segment will also ensure filled order books for the upstream suppliers for wire, cable and pipes. The Indian subcontinent experiences a phase of heavy investment: in canals, bridges, stressed, civil engineering – in a nutshell: in infrastructure projects that are scheduled to last for decades and will boost sales.

Due to strongly increased attendance at the previous events organisers again expect over 12,000 trade visitors at the Bombay Convention & Exhibition Center in 2018.

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Messe Düsseldorf GmbH

Tube India – Online exhibitor registration open

Online exhibitor registration for Tube India 2018, 8th All Indian International Exhibition & Conference for the Tube and Pipe Industries, is open at <http://www.tube-india.com/>. The deadline to reserve exhibit space is August 31, 2018. The event will take place from November 27 - 29, 2018, the Bombay Exhibition Center in Mumbai.

Held concurrently will be wire India and Metallurgy India as well as Welding & Cutting India. Messe Düsseldorf and its Indian subsidiary Messe Düsseldorf India are the organizers of Tube India, wire India and Metallurgy 2018 while Welding & Cutting India 2018 is jointly organized by Messe Düsseldorf India and Messe Essen.

Exhibit categories at Tube India 2018 will include tube manufacturing machinery, raw materials, tubes and accessories, refurbished machinery, measuring and control technology as well as Pipeline and OCTG technology, profiles and the plastic tube forum.

Together, the four trade fairs cover the complete spectrum of metal working and processing. The events have the support of the international associations ITA (International Tube Association), IWCEA (International Wire

and Cable Exhibitors Association), IWMA (International Wire & Machinery Association), ACIMAF (Italian Wire Machinery Manufacturers Association), WCISA (Wire and Cable Industry Suppliers Association) U.S. The Indian associations SWMAI (Steel Wire Manufacturers Association of India) and AIWMA (All India Weldedmesh Manufacturer's Association) are also providing support.

When last held in 2016, 406 exhibitors presented the latest technologies at Tube India, wire India and Metallurgy on 86,000 square feet of exhibit space. In addition to the participation of exhibitors from India, the shows again featured large country pavilions from Austria, China, Italy, Germany and the U.S. About 12,300 trade visitors took part - a 28% increase compared to the previous events.

For further information on visiting or exhibiting at Tube India, wire India or Metallurgy 2018, contact Messe Düsseldorf North America, 150 North Michigan Avenue, Suite 2920, Chicago, IL 60601. Telephone: (312) 781-5180; Fax: (312) 781-5188; E-mail: info@mdna.com; Visit <http://www.tube-india.com> and <http://www.mdna.com>; Follow us on twitter at http://twitter.com/WireTube_MDNA



Transformation of tube and pipe manufacturing adopting digital technologies



International Tube Association India Chapter, in association with Messe Dusseldorf India, is holding a one day conference with the theme TRANSFORMATION OF TUBE AND PIPE MANUFACTURING ADOPTING DIGITAL TECHNOLOGIES on November 28, 2018. The Conference will focus on topics like Industry 4.0, Automation, Industrial Robotics, Sensor based Data Collection and Monitoring Systems in Manufacturing, 3 D Printing, Cloud Computing, Virtual Reality, Artificial Intelligence, Predictive Maintenance, Vision Systems and similar, as applied to Tube and Pipe Manufacture. Progressive depletion of natural resources and Competition for such resources and market competition will demand more Efficient and Robust processes in Manufacturing and delivery of value to customers. Digital Technologies is the focus of Manufac-

turing Management today and how it is transforming Tube and Pipe Manufacturing will be discussed at this Conference.

The organizers wish to invite Researchers, Equipment Manufacturers, Consultants, Advisors, and Practitioners of Digital Technology, Automation and Software companies to share the body of knowledge that they have gathered in this area,. The Conference will also feature live case studies of adoption of Digital Technology in Tube and Pipe Manufacture that has helped the user to derive multiple benefits of their application. The delegates will mainly be from the Suppliers to and Manufacturers in the Tube and Pipe Industry, as well as from users of Tubes and Pipes. The organisers are keen to encourage New Ideas and New Product launches at the Conference.

The Conference will be held on 28th November 2018, alongside Messe Dusseldorf India's Exhibition on Tube, Wire and Metallurgy, between 27th and 29th November 2018, in Mumbai. Speakers at this Conference will be addressing a larger audience who will attend the Conference and the Exhibition together. The speakers will also be able to get a flavor of the progress being made in India, in manufacturing, in these areas.

Please submit your Expression of Interest as a speaker at this Conference and the Title of the Paper immediately and follow this up with a synopsis of the paper before 31st July 2018, to ITA India Chapter, by email.

International Tube Association India Chapter

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Steelfab 2018

Midde East pipes & tubes sector set to turn red hot

Rising oil prices have brought the focus back on the oil and gas sector in the region with the pipes and tubes sector standing to gain the most.

The oil price has surged to four-year highs to around US\$75 a barrel, from around US\$55 a few months ago, boosting oil export receipts for GCC governments and encouraging them to spend more to stimulate growth.

“Every rise in the average price of oil boosts the budget position of regional governments and their spending power. Now, apart from the revival of stalled projects, infrastructure, construction and transport projects are set to increase significantly across the GCC. Oil and gas projects account for a big chunk of active projects in the region and one segment that stands to benefit is pipes and tubes,” said H.E. Abdalla Sultan Mohamed Al Owais, Chairman of the Sharjah Chamber of Commerce and Industry & Expo Centre Sharjah.

The buoyant market has resulted in a significant rise in queries for the upcoming edition of the region’s premier metal working industry event, SteelFab 2019, which hosts a special segment on Pipe and Tube Machinery. The 15th SteelFab will be held at Expo Centre Sharjah from January 14 to 17, 2019.

“With regional fabricators working with pipes and tubes seeing a steady rise in business, the Pipe and Tube Machinery section has been expanding fast at SteelFab. The continued support of a global body like the International Tube Association and rising number of participants can be seen as a proof of its popularity,” said H.E. Saif Mohammed Al Midfa, CEO of Expo Centre Sharjah.

SteelFab 2019 will continue its tie-up with the ITA, the global association for the tube & pipe industry that has hundreds of members from nearly 600 organisations worldwide, for the third consecutive year. Apart from facilitating the participation of international suppliers, the tie-up helps in fostering knowledge exchange and networking.

“The International Tube Association (ITA) enjoyed so far a good cooperation with Expo Centre and SteelFab for the show and we are excited to continue our partnership, to facilitate the introduction of equipment, innovations, technology and related services for the regional tubes and pipes industry.,” said Mr. Dietger Schrörs, Executive Secretary of ITA.

During the previous edition, the Pipe & Tube Machinery section featured nearly 60 exhibitors from Italy, the Netherlands, Portugal, France, Japan, the US, Germany, Turkey, Finland, Canada, Taiwan, Poland, the UK, Denmark, India and the UAE. It also saw the launch of new technology like pipe alignment trolley by Yes Machinery and pipe facing machine by Nuova Patavium, among others.

SteelFab 2018 hosted 290 exhibitors from 28 countries who displayed about 1,000 brands from across the world and attracted 7,123 trade visitors from scores of countries. Apart from the Pipe & Tube Machinery other special segments at SteelFab 2018 included Wear Resistant, Welding & Cutting and Machine Tools, seminars & technical presentations, live displays, Essen Welding & Cutting Pavilion, and the Fasteners World Middle East, a dedicated vertical for the complete range of industrial fasteners and fixings.

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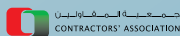
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Indometal 2018

Booming Indonesian economy opens new opportunities to Southeast Asia's metal and steel markets



Vibrant show floors abuzz with activities

The 4th edition of indometal – the International Metal & Steel Trade Fair for Southeast Asia, returns to JI Expo, Kemayoran, Jakarta, Indonesia from 17 – 19 October 2018

Indonesia has seen tremendous economic growth and developments, and by 2030, Indonesia's GDP is projected to exceed US\$3.7 trillion. The country's growth has been propelled by advances and increased focus in infrastructure, oil and gas, mining and power generation. Its metal and steel market remains lucrative, as the country could surpass India's as the world's second largest stainless steel producers in the next few years. Leveraging on this growth, the country also announced the development of three steel industry clusters worth a total investment value of US\$14.89 billion. Accelerated growth in infrastructure is also taking place in Indonesia, with the country's government extending their invite to foreign investors to invest in various infrastructure projects. These trends could certainly

benefit the metal and steel market with the import of raw materials, steel production and infrastructure development.

The staging of indometal 2018 therefore comes at an opportune time for businesses wanting to expand their foothold into the vast Indonesian market.

Driven by the established know-how and credentials of German-based events under the Messe Düsseldorf group – GIFA, METEC, THERMPROCESS AND NEWCAST, and jointly organised by Messe Düsseldorf Asia and PT Wahana Kemalaniaga Makmur (WAKENI), indometal 2018 is set for another successful edition with 300 exhibitors from 30 countries, including the participation of national pavilions and country groups such as China, Germany, Italy and Taiwan, as well as established companies in the likes of Makmur Meta Graha Dinamika and Hitachi High-Technologies.

Some 5,000 qualified trade visitors from a diverse range of industries, manufacturing, mining, ship building and automotive are expected at the three-day trade fair. Visitors can look forward to worthwhile networking opportunities and a wide array of innovations in the fields of metallurgy, foundry equipment, thermo process technology, semi-finished and finished products, accessories and tubes to fulfill their sourcing objectives and value-add to their business.

As a platform for knowledge exchange, discussions on the latest market trends will be explored through an industry-led seminar and technical presentations by exhibitors. Organised by the Indonesian Foundry Industries Association (APLINDO), the Indonesian Foundrymen's Association (HAPLI) and the trade fair's co-organisers, the seminar titled "Supporting the Government's Program to Strengthen Upstream Industry", will feature a stellar line-up of industry speakers, including a keynote speech by the Ministry of Industry, Republic of Indonesia. Topics covered include the development of the smelter industry in Indonesia, mineral processing process and trends in the aluminium sector. While exhibitor's technical presentations by PT Green Plus Indonesia, O.M. LER Srl, PT Spektris Metalab and Octo Corindo will see launch of latest products and introduction to their newest technologies.



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Düsseldorf set to be a meeting point for international valve and fittings experts again in 2018



Düsseldorf, Germany
27.–29. November 2018
www.valveworldexpo.com

VALVE WORLD EXPO 2018 – the world of valve manufacturers and users is meeting in Düsseldorf again from 27 to 29 November 2018. Occupying Halls 3, 4 and 5 of the Düsseldorf Exhibition Centre, this will be the fifth time in Düsseldorf that technical highlights and products will be showcased by international specialists in valves, valve-related products, actuators, compressors and engineering services as well as publishing companies and software houses.

The trade fair organisers are expecting to welcome over 700 exhibitors from 40 countries, filling an exhibition space of around 20,000 square metres. The last event in 2016 was attended by 12,420 trade visitors from 89 countries, underlining the high level of internationalism among

both exhibitors and visitors and thus also the worldwide significance of the trade fair.

Industrial valves, fittings and valve engineering are key technologies that play crucial and indeed indispensable roles in all sectors of industry. The trade fair is therefore attracting visitors from a wide range of sectors: petrochemicals, oil and gas, the chemical industry, marine and offshore, food, water and wastewater management, automotive, mechanical engineering, pharmaceuticals, medical engineering and power engineering.

The accompanying VALVE WORLD Conference 2018 in Hall 4 will be an integral part of the event, with expert talks and workshops given by international speakers.

A special show entitled Pump Summit will be held in Hall 5, demonstrating both visually and in content that it is closely integrated with the conference and the trade fair.

The show will feature state-of-the-art pump technologies and the latest results from science and research. Acting as an interface between valve and fitting technologies, the Pump Summit will provide a valuable addition and create important synergies for visitors.

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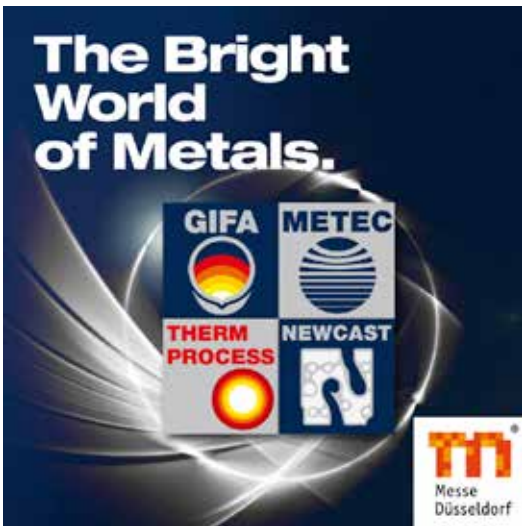
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Messe Düsseldorf

GIFA, METEC, THERMPROCESS and NEWCAST are striking out for success



lurgy technology truly beats in Düsseldorf. No other trade fair covers the entire range of foundry technology, casting products, metallurgy and thermal processing technology to this in-depth extent or with such a wide scope. The main players within the industry as well as smaller, innovative companies will be returning to Düsseldorf in 2019. "This scope, providing near total market coverage in terms of both supply and demand, is GMTN's secret to success", explains Friedrich Kehrer, Global Portfolio Director Metals and Flow Technology at Messe Düsseldorf GmbH. "Over half of the 78,000 visitors to the GMTN 2015 were top executives and decision makers. In addition, over half of our visitors came from outside Germany. The top ten countries in terms of foreign visitors included Brazil, China, Iran, India, the USA, France, Italy, Austria and the UK." The quartet of trade fairs also addresses and focuses on current and significant topics, such as Industry 4.0, e-commerce within the steel and aluminium industries, lightweight construction for the automotive industry and additive manufacturing. These topics provide important stimuli and require additional investment.



Stakeholders in the international industry are setting their sights on this quartet of Düsseldorf trade fairs in June 2019

New: Special show for additive manufacturing

GIFA provides stimuli for e-mobility

The official closing date for registration has closed, and now it is clear that GIFA, METEC, THERMPROCESS and NEWCAST are set for success once again. Around 2,000 exhibitors from around the world will come together in Düsseldorf from 25 to 29 June 2019, under the slogan "The Bright World of Metals". This long-standing quartet of trade fairs in Düsseldorf proves once more that the heart of trade fair activity for international foundry and metal-

The second significant factor in the success of the "Bright World of Metals" is the supporting program, which includes international congresses and industry meetings such as the GIFA Conference, the European Steel Technology and

Application Days/ESTAD, the European Metallurgical Conference/EMC, the THERMOPRESS Symposium and the NEWSCAST FORUM. Awards ceremonies such as the NEWCAST Awards and special shows, like the one that the Research Association of Industrial Furnace Manufacturers in the VDMA/FOGI puts on for the various industries.

The Special Show for Additive Manufacturing will make its premier at GIFA in Hall 13. Whether you work in pattern and die making, in core making or in direct metal printing, foundries and their suppliers, additive manufacturing provides foundries and their suppliers with great potential for growth/business. "We wanted our special show to provide a platform to unlock this potential", explains Gerrit Nawracala, Deputy Director for Metals and Flow Technology at Messe Düsseldorf GmbH. "GIFA will provide a powerful boost for the industry, particularly in e-mobility and lightweight construction in the automotive industry. This was recently proved in a study on the influence of electromobility on the foundry industry and its products initiated by the Confederation of German Foundry Industry (BDG). According to the study, alternative drive concepts such as hybrid and electric drives require increasingly high casting quantities in comparison to those for single drives on a combustion motor, and this will continue to be the case up until 2030." It is probable that the peak in demand for casting will only be reached in 2030, according to the study from the BDG, thus providing optimal conditions for GIFA 2019.

GIFA: A hotspot for technological highlights

GIFA has been a hotspot for technological highlights and innovations for the entire value-added chain in casting technology for decades, and will prove itself once more in 2019. Over 900 exhibitors, from all over the world, will be present in Halls 10 to 13 and 15 to 17. World market leaders have already confirmed their presence, notably Bühler AG (Switzerland), Kuka Deutschland GmbH (Germany), Loramendi S. Coop (Spain), the Sinto Group (HWS - Heinrich Wagner Sinto/Germany) and Vesuvius GmbH (Germany). As was the case in 2015, a great number of industrial players from China and Italy have also already registered for this trade fair. "We are currently conducting intense agreement talks with the companies. They are all certain that they will be present at GIFA, so the questions that need to be answered now are how big will their presence be, and where do they want to present", says Janike Rotthoff, Senior Project Manager. "I'd recommend that companies who are interested to participate in GIFA register as soon as possible, so that they can still get a good stand location".

METEC 2019: The 10th edition is set for success

In its 10th edition, the International Metallurgical Trade Fair with Congresses will continue to build on its success from 2015. In concrete terms, this means that over 500 exhibitors from around the world will present systems for manufacturing iron ore, steel and non-ferrous metals, or for casting or moulding steel and equipment and components for metallurgical plants, rolling mills and steelworks in Halls 3, 4, and 5. "The industry's

interest in METEC is very positive. Many of the international market leaders have already confirmed their attendance, and we're currently discussing the details with others", explains Senior Project Manager Marcus Müllers. The following companies have already confirmed that they'll be exhibiting: Inteco (Austria), Primetals Technologies Ltd. (UK), RHI Magnesita (Austria), SMS Group (Germany), Tenova S.P.A. (Italy) and Sinosteel (China). Forged components will be displayed at METEC for the first time ever. Up until now, these had been part of NEWCAST, but they now fit in better with the themes of the metallurgy trade fair as they have grown in significance and popularity.

Industry greets at THERMPROCESS

"With around 50% of our participants coming from outside Germany, THERMPROCESS is also one of the world's leading trade fairs and is a must-attend event for international suppliers", states Jennifer Dübelt, Senior Project Manager, confirming that the trade fair is on track for success. This also reflects the current registration levels, with many industry greats on the list: Ajax Tocco Magnethermic GmbH (Germany), Andritz März GmbH (Germany), Electrotherm (India), Honeywell Thermal Solutions - Elster GmbH (Germany), Inductoherm Europe Ltd (UK), ITG Induktionsanlagen GmbH (Germany) and Seco/Warwick Europe (Poland) will display technological trends for manufacturing and usage of industrial furnaces and heat generation plants. "Our indications show that trade visitors can expect to see items from around 300 exhibitors", states Dübelt.



Elected unanimously – the President of METEC 2019: Dr.-Ing. Guido Kleinschmidt, member of the management board of SMS Group GmbH. The election was necessary as former METEC-President Marcel Fasswald left the SMS Group.

NEWCAST: The most international trade fair

“NEWCAST has matured into an internationally significant trade fair”, says Caroline Schmidt, Junior Project Manager for NEWCAST. The whippersnapper in the metal trade fair quartet was brought to life in 2003 and its popularity has been growing ever since. Schmidt: “Producing cast parts has really developed on an international scale over the last decade, and that is reflected at NEWCAST”. In 2019, over 400 exhibitors are due to present their latest products in Halls 13 and 14. NEWCAST is also studded with the shining stars of the international market, including Bosch Rexroth AG (Germany), GF Casting Solutions AG (Switzerland), GOM GmbH (Germany), Kimura Foundry Co., Ltd. (Japan), Kutes Metal Inc. (Turkey) and Finoba Automotive GmbH (Germany). Another striking factor in this trade fair are the large amounts of participants hailing from China, India and Turkey.

The Bright World of Metals

The GIFA (International Foundry Trade Fair), METEC (International Metallurgical Trade Fair), THERMPROCESS (International Trade Fair and Symposium for Thermo Process Technology) and NEWCAST (International Trade Fair for Castings) are a set of four international technology trade fairs and will be held across 14 halls from 25 to 29 June 2019. It is expected that they will receive over 2,000 exhibitors and around 78,000 visitors. Casting products, foundry technology, metallurgy and thermo processing techniques will be shown to the world over the course of five days in the capital of the Rhine region. The trade fairs are accompanied by a high-quality program including seminars, international congresses and series of lectures. For further information, please visit www.gifa.de, www.metec.de, www.thermprocess.de und www.newcast.de or www.tbwom.com.

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Tube Southeast Asia

Thailand's economic growth, increased infrastructure spending heightens demand in tube and pipe industries

Riding the wave of opportunity, Tube Southeast Asia 2019 – the 12th International Tube & Pipe Trade Fair for Southeast Asia, returns to the Bangkok Trade & Exhibition Centre (BITEC), Thailand from 18 – 20 September

According to the latest edition of the World Bank's Thailand Economic Monitor, Thailand's economy is set to grow by 4.1 percent in 2018, its best economic performance since 2012. Rapid export growth, increase in capacity utilization and acceleration in capital goods imports, as well as education and skills reform, strong implementation of quality infrastructure investments and increasing competition are some of the factors lifting Thailand onto a new path of higher, long-term growth.

Zooming into infrastructure investments, the Thai government has pledged 1.5 trillion baht (\$62 billion) over the next five years, along with private funding and foreign direct investment, to boost growth. These would be through developments of its three eastern provinces into the Eastern Economic Corridor (EEC) – which would serve as hubs for technological manufacturing and services with strong connectivity by land, sea and air, extensions to its mass transit systems in the Greater Bangkok Region, and expansion in real estate.

Beyond infrastructure, the rising applications across end-use indus-

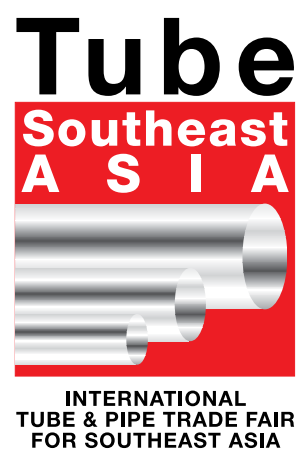
tries from automotive, household appliances to consumer electronics will also trigger higher demand for tube and pipes. On the automotive front, Thailand is on target to be the 6th biggest automotive market globally and the hub for next-generation auto products.

On the back of these robust industry outlook and trends, the strategic and timely staging of Tube Southeast Asia 2019 will pave the way for tube and pipe businesses to make their entry into the Southeast Asian markets, specifically Thailand, and take advantage of these in-market trade opportunities when they exhibit.

About Tube Southeast Asia 2019

Reflecting the established credentials of the world's leading trade fair, Tube Düsseldorf – the International Tube Fair, Tube Southeast Asia 2019 will feature a wide-ranging exhibit profile of machinery and technology highlights in tube and pipe manufacturing, processing and finishing, pumps and valves, new processes in measuring, control and test engineering as well as new and upgraded tools and auxiliary materials. The specialist trade fair with a visitor profile that includes manufacturers, suppliers and buyers from the tube, automotive, oil & gas, building and construction, energy and electrical industries, will also be augmented by a series of industry-focused conferences and seminars.

Held together with wire Southeast Asia 2019, the synergistic fairs will be grounds to a conglomeration of global expertise spanning the wire, cable, tube and pipe sectors by over 400 leading exhibitors from around the world. Some 9,000 trade visitors are expected to visit – reaffirming wire and Tube Southeast Asia's draw as the focal platform to insights of the industries' latest developments and an arena for face-to-face meetings in forging business linkages and partnerships.



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Within Thailand

Exposis Co., Ltd


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Diary of world class tube events





September 2018

11 – 12 September 2018	CONFERENCE: Dortmunder Kolloquium zur Rohr- und Profilmformung (DORP) Dortmund, Germany	www.iul.eu/veranstaltungen/dorp18/	
26 – 29 September 2018	EXHIBITION: Tube China Shanghai, P. R. China.	Messe Düsseldorf GmbH Fax: +49 211 4560 8540 MuellersM@messe-duesseldorf.de www.tubechina.net	
27 – 28 September 2018	SEMINAR: Tube & Pipe Industry Development Seminar 2018 „How to stay competitive in difficult times – innovations & latest technical solutions“ Organised by International Tube Association e. V. in connection with Tube China 2018	International Tube Association e.V. Jennifer Kranz Tel.: +49 211 947-5650 Fax: +49 211 947-3938 jennifer.kranz@itatube.org www.itatube.org	

Oktober 2018

17 - 19 October 2018	EXHIBITION: indometal Jakarta, Indonesia	Messe Düsseldorf GmbH Fax: +49 211/4560-87478 BagciC@messe-duesseldorf.de www.indometal.net/	
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November 2018

6 – 8 November 2018	EXHIBITION: Fabtech Atlanta, USA	www.fabtechexpo.com	
27 – 29 November 2018	EXHIBITION: VALVE WORLD EXPO Düsseldorf, Germany	Messe Düsseldorf GmbH Fax: +49 211/4560-87 568 nawracalag@messe-duesseldorf.de www.valveworldexpo.de	
27 – 29 November 2018	EXHIBITION: Tube India Mumbai, India	Messe Düsseldorf GmbH Fax: +49 211 4560 8540 AhrensG@messe-duesseldorf.de www.tube-india.com	
28 November 2018	CONFERENCE: ITA CONCLAVE at Tube India Topic: Transformation of Tube and Pipe Manufacturing Adopting Digital Technology	International Tube Association – India Chapter 5, Brindavan Street, Mylapore CHENNAI 600 004 Tel.: +91-44-4500 0217 lakshmi@itatube.in	


January 2019

14 – 17 January 2019	EXHIBITION: SteelFab Sharjah, UAE	Expo Centre Sharjah Fax : +971-6-5770111 steel@expo-centre.ae www.steelfabme.com	
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May 2019

14 – 17 May 2019	EXHIBITION: Tube Russia Moscow, Russia	EXPOCENTRE in Moscow Fax: +49 211 4560 8540 AhrensG@messe-duesseldorf.de www.tube-russia.com	
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June 2019

25 – 29 June 2019	EXHIBITION: METEC Düsseldorf, Germany	Messe Düsseldorf GmbH Fax: +49 211 4560 8540 MuellersM@messe-duesseldorf.de www.metec-tradefair.com	
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September 2019

17 - 19 September 2019	CONFERENCE: Pipe & Tube Memphis 2018 Memphis, USA	Audrey Long, CAE, Sr. Manager, Education and FMA Store Fabrica- tors and Manufactures Association, International, audrey@fmanet.org, Fax: 815-227-8206, Tel.: 815-227- 8206	
18 – 20 September 2019	EXHIBITION: Tube Southeast Asia Bangkok, Thailand	Messe Duesseldorf Asia Pte. Ltd. beatrice@mda.com.sg www.tube-southeastasia.com	

October 2019

1 – 3 October 2019	EXHIBITION: Tubotech Sao Paulo, Brasil	www.tubotech-online.com	
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ITA e.V.

Technical Committee Report and ITA Technical Paper Award



One of ITA's main objective is the support of innovation and growth within the tube industries.

Our tools for this are the ITA Tube Journal, own and co-organised conferences and seminars, our website and activities in social media. Beside member news the technical papers are a substantial part in our media as well as the presentations at our conferences.

In the period 2016 / 2017 the Technical Committee was active in searching, selecting and clustering interesting papers for the ITA Tube Journal, the seminars in connection with Tube Shanghai Fair 2016 and Tube Russia 2017 further for our ITA Intl conference in Nov 2017 in Düsseldorf.

We thank all companies and individuals who submitted papers in 2016 / 2016 enabling us to make ITA Media continuously attractive and filled our conferences with interesting presentations for the benefit of the readers and conference participants.

The Technical Committee chooses from all papers submitted every two years one outstanding paper for the ITA Technical Paper Award. This years winner is a paper presented during our Intl Conference in Düsseldorf.

The award winning paper „Novel signal processing of online wall thickness gauge profiles for production monitoring of hot seamless steel plants by Marc Choquet P.Eng PH.D and Olivier Duchesne Bamber of Tecnar ; Canada describe a process that is technically imaginative for production monitoring, analyses, and optimising mill operation.

When the process is applied it could easily become a game changer and by this become a winner for the creating company and those companies which install and use it in their production process.

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Andreas Jahr	Hochschule Düsseldorf, Fachbereich Maschinenbau und Verfahrenstechnik	Germany
Martin Nachtrodt	Hochschule Düsseldorf, Fachbereich Maschinenbau und Verfahrenstechnik	Germany
Walter Müller	Hochschule Düsseldorf, Fachbereich Maschinenbau und Verfahrenstechnik	Germany
Bob Beattie	Oxford Sensors Ltd	UK
Jing Zhao	Oxford Sensors Ltd	UK
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Christopher Heftrich	Lehrstuhl für Umformtechnik Siegen	Germany
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Frank Hoffmann	TU Bergakademie Freiberg, Institut für Metallumformung	Germany
Matthias Schmidtchen	TU Bergakademie Freiberg, Institut für Metallumformung	Germany
Rudolf Kawalla	TU Bergakademie Freiberg, Institut für Metallumformung	Germany
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