

## **FA 04 wire 2014:**

### **Bending with spring-back compensation, modular wire-drawing and cable-stranding systems, 3-D wire gauze, cables with integrated anti-theft component**

The wire and wire-processing industry and trade fair *wire*

It would be impossible to imagine today's world without wire and the products made from it such as cable, springs, screws or wire rope. These and other products manufactured by the wire, cable and wire-processing industry are necessary for transferring electricity, electronic data or mechanical energy. The general development and advances in the wire industry are closely intertwined. Every two years the international sector trade fair *wire* informs all parties involved about the achievements so far and what is technically feasible.

### **Tendencies**

High performance requirements and cost pressure have heavily marked the wire and wire-processing industry for a long time now. In order to assert themselves economically, companies have to respond flexibly to market and customer requirements and ensure the most cost-effective production possible - which presupposes modern production facilities corresponding to state-of-the-art technology. The tendencies we are observing include an economical use of energy but also the efficient approach to raw materials. This is achieved by producing the minimum quantity of rejects possible during the ramp-up and production process while minimum use is made of the permissible production tolerances. For specific applications, for example in the automobile sector, copper conductors are being increasingly replaced by aluminium versions, which due to their good availability are much more cost-

effective than copper and are characterized by their relatively low weight in comparison.

Another trend is reflected in wire manufacturers and processors expecting their suppliers, especially those in the mechanical engineering sector, to provide them with as many services as possible from a single source along with a comprehensive, ready-to-use customer support service at all times and fast supply of spare parts. Large machinery manufacturers among the *wire* exhibitors such as Wafios and Niehoff have long since departed from the “classic” machine-builder to become systems and technology partners and are offering holistic solutions tuned to the individual requirements of their customers.

### **Innovative production technology**

Increasingly higher requirements are being placed on the dimensional accuracy of wire parts. For a long time now experts have been working on bringing spring-back phenomena under control, where for example the bending of a wire component is followed by a spring-back action. Machine manufacturer Wafios caused quite a stir at *wire 2012* with its new “iQ” software product family, which covers all the advanced control functions: with the help of existing sensor technology already incorporated in modern Wafios machines, the spring-back action can be analysed in the production of bending parts and corrected using control technology. “iQ” programmes also help to further optimise the set-up times, process speed, availability and, as a result, ultimately machine performance. In the “hardware” area Wafios presented eight machines, all of them world premieres, for the sectors wire-bending, coil spring and torsion spring production, nail production as well as the straightening of smooth and concrete-reinforcing steel.

The general technical further development also means that cables and connections are required which offer increasingly complex compositions. In its October 2012 edition, *Draht* trade magazine describes advances in this field. Among others, it takes a look at the DSI wire-stranding system concept devised by Maschinenfabrik Niehoff, according to which automobile conductors, building cables and special cables such as bus, data, sensor, signal LAN and instrumentation cables can be manufactured. With elements such as double-twist back-twist pay-off, longitudinal tape pay-off, pre-twisting machines and other systems, the stranding machines in the DSI production series - one of these models was demonstrated at *wire 2012* - can be used to form complete facilities perfectly combined with the requirements of the users of coordinated systems and also re-configured at all times. Depending on the configuration, in one run, up to 3 films can be applied to one cable under controlled tension. Using the optional "Triple Twist" mode the stranding speed and thus the production capacity can be considerably increased.

Thanks to a modular system, the Rubin multi-wire drawing machines used to produce wire from steel and steel alloys, built by the Kieselstein Group, successor to drawing-machine manufacturer Herborn+Breitenbach, also offer a great deal of flexibility in terms of configuration. At *wire 2012* a draw-peeling unit was also presented, which can be integrated in drawing-machines and clearly improves the surface quality of the drawn wire for a relatively low investment. In cooperation with two research institutes, Kieselstein has also developed a process in which three-dimensional wire gauzes can be produced, and in June 2012, in recognition of this, received the 2012 Steel

Innovation Prize in the “Research and Development” category from the Stahl-Informationszentrum, Düsseldorf.

### **Innovative wire and cable products**

The “strucwire” 3D wire gauze is produced using intertwined wire spirals, which are connected with each other in positive-interlocking and can also be integrated in sandwich structures. It is characterized by a low specific weight, tailor-made thermo mechanical properties and also has functional characteristics such as high energy absorption, good damping properties, low heat conductivity and spacious surface. As a result, these 3D elements are being opened up to new areas of application in the lightweight construction sector and automobile industry, but also in the tank/container construction, chemical engineering or medical engineering fields. In this connection therefore, spinal implants made from a titanium-based wire structure are conceivable, the mechanical characteristics of which are adapted to human bones. Compared to other cellular materials, a further advantage offered by the 3D wire structures is their repeatable composition and calculable characteristics.

The cable sector is also offering further scope for spectacular new developments and trends. In this connection, cable manufacturer Nexans has developed two solutions which are geared to halting the increasing numbers of railway cable thefts. These cables are particularly susceptible to theft as they are clearly visible and in most cases readily accessible along railway tracks. In addition their conductors are completely made of copper, which has a high market value. One solution is to lower the market value of any stolen cables by protecting the main copper conductor through a multi-wire reinforcement consisting of copper and zinc-plated steel coupled with a polyethylene

sheathing. The steel wire makes it very difficult for thieves to cut away the cable using conventional tools. In addition it is practically impossible to separate the copper from the steel so that the stolen copper has a considerably lower value on the black market. The other solution is based on a fire-proof copper ribbon with special marking. Thanks to the marking, the origin of the stolen copper, which is then offered to a scrap dealer, can be more easily traced. As the ribbon is applied to the entire length of the conductor, it is practically impossible to remove the ribbon.

### **Trade fair wire: a success story**

The trade fair wire, **the** leading international sector trade fair for all areas of the wire, wire-processing and cable industry, is the venue where all the internationally renowned manufacturers of wire and cable machines and accessories present their innovations and new products to the specialist world for the first time. 1,313 exhibitors from 50 countries participated at wire 2012 and occupied space of over 57,000 m<sup>2</sup>. The next wire, from 7 to 11 April 2014, will already be held for the 15<sup>th</sup> time in Düsseldorf. Synergy effects are generated through the parallel staging of the event in halls adjacent to the international pipe and tube trade fair Tube.

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