



Case Study

Aluminium Rheinfelden GmbH

Operation under heat, dust and vibrations –
Industrial PC's take on quality insurance in
aluminum processing



noax industrial PC's help to ensure quality at Aluminium Rheinfelden GmbH

100% performance despite rough environment

When Marcus Bauereiss takes his visitors through the Aluminium Rheinfelden plant, one is reminded of industrial facilities in the early 20th century. The front of the building is made of red brick and is more reminiscent of the Ruhr region than of a small town in Baden. On the inside, the impression of heavy industry continues. In one hall, smelting

furnaces stand 12'; a gate of one furnace is about 6' wide. When it opens, a sea of orange-yellow, glowing, molten aluminum at approxi-

"We can only afford computers which run all the time, even under critical environmental conditions."

mately 750°C becomes visible. The smelting of primary aluminum is the first processing step in the production of aluminum discs, with a diameter from 0.394 inches to 7.87 inches and is used for the production of spray cans, pressurized containers, aluminum bottles, tubes or similar packaging materials. The hall contains not only smelting and casting furnaces, but also a noax S15 Stainless Steel IPC. It is used by the operators to determine the origin of the metal. Total documentation of all processing steps and the ability to trace them serve as essential components of quality assurance, which is very important to the company. Aluminum plates must have purity between 99.5% or 99.7%. This means that of 1,000 parts of metal, 995 or 997 parts are aluminum and only three or five parts are non-aluminum. The company guarantees its customers an always consistent material. In order to be able to trace each production step, the employees require an IT set-up on the cutting edge of technology. From the start, noax industrial computers are the backbone of data processing in the production areas. To start the process, operators enter data in their

mobile PC's with the help of barcode scanners to determine who produced the pig aluminum and what its weight is. Pig aluminum is the technical terminology for the incoming raw material. Via WLAN, the data is sent from the scanner directly to the industrial computers. This data cannot be processed in an office far away from the production site because only the operators know exactly what batch



An employee checks the data at the aluminum processing facility with a noax IPC

they took to the furnaces. For that reason, the rugged IPC must be located about 32' from the smelting furnace gates.

Completely dustproof

In the summer months, the air can heat up to 60°C in the building. In spite of these extreme temperatures, the noax industrial PC's continue to provide reliable service 24 hours a day.

Aluminum production produces dust and soot, which normally accumulates on the walls and machines. This does not affect the noax IPC's because they do not have ventilation slots or external fans. This was a critical issue for competitor computers because they were severely affected by the harsh conditions which lead to a lot of downtime. There is no help for a computer with this problem: It will soon overheat and stop functioning. In contrast, noax industrial PC's are completely sealed, according to protection class IP65 (NEMA 4), and is protected against harsh conditions. Heat produced by processor activity in the computer is dissipated to the outside via an internal fan and a specifically engineered enclosure. From the smelting furnaces, the red-hot metal flows to casting furnaces and from there to casting machines, where liquid aluminum is poured into a band about 7.9 inches wide. Over several processing steps, the band gets cooled, milled and examined for flaws by a camera system. Finally, a coiler winds the aluminum band on coils, about 6' in size. A crane scale then weighs the coils and sends this information to a second noax touch panel computer in the production chain, where each coil receives its own data record, containing order number, thickness, weight and batch number. This information is converted to a barcode by the IPC and a connected printer produces an adhesive label, which is attached to the coil. The IPC then sends this data to the goods management system, SAP R3, where the data is managed.

Resistant to extreme vibration

The most significant production step is the stamping of the aluminum plates. The round aluminum plates can be flat, curved or pre-

Slugs – aluminum semi – are the starting material for numerous things for daily life including: aerosols, toothpaste tubes, thermo parts for cooking appliances or trendy beer bottles. Since only best quality meets the customers' high expectations, the Aluminium Rheinfelden Company has to rely on most modern technology. Of course, noax industrial PC's are included.

From sausage meat to cooling storage – noax industrial PC's allow for complete traceability



embossed, with or without holes. All of this requires about 800 stamping tools. The stamping machine operators scan the label on the coils and, with the help of the IPC located directly next to the stamping machine, compare the coil data with the order. The IPC has to be able to withstand the constant vibrations caused by the stamping machine. However, these vibrations do not impact the noax IPC due to all components and connectors being firmly fixed in place and will not come loose, even under the toughest vibrations. A conveyor belt transports the aluminum plates from the stamping machine to an annealing basket. The basket keeps the temperature above 500°C, since the plates have to be soft annealed and cleaned of any oil. A heat-resistant barcode is attached to the basket, and the data is tied to the aluminum plates in the respective basket. This allows precise knowledge of what material is in which basket and its

characteristics. A 15" noax touchscreen PC is securely mounted directly at the furnace, which scans the baskets and also sends the data to the SAP R3.

Extreme ruggedness

After leaving the annealing furnace, the annealing baskets are temporarily stored in a high-bay warehouse. The storage and retrieval unit which transports the baskets to their respective places for storage receives its commands from a noax PC. It stores the baskets at random, meaning independently of the order. In case of problems, the operator has the ability to resolve the problem on location step by step, with the help of the mobile panel. The panel is connected to a noax computer, and both exchange data with each other. One of the last steps in the process is roughing up the surface of the aluminum plates. The

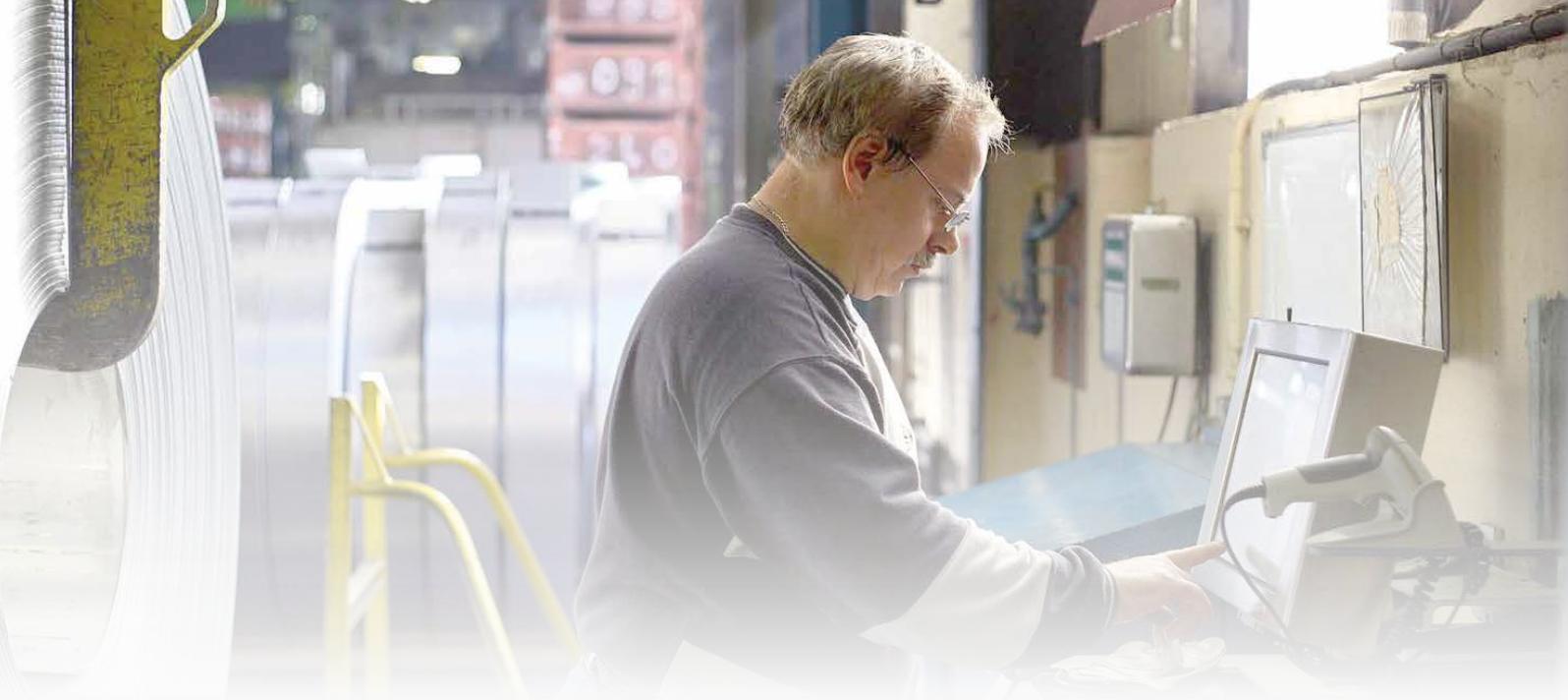
annealing baskets are removed from their temporary storage place and automatically delivered to the roughing facility. Roughing is done according to the customer's request by various methods: by vibration or spraying of the plates. During vibration, the plates roughen themselves, and

during spraying, an aluminum granulate is cast against the plates. After the surface treatment, the round plates are retrieved from additional temporary storage and automatically sent to a packing facility, sorted by job order, and prepared for shipping. The most important criteria for Marcus Bauereiss and his team, in regard to investing in equipment are consistent availability and the stability of the computers. Here, an information technology set-up is no exception. The environment places high demands on the noax computers in regard to ruggedness: close proximity to the smelting furnaces, temperatures up to 60°C, dust created by production, and vibrations of the stamping machines. noax rugged and reliable industrial computers are able to withstand all of these environmental demands. However, technical reasons are not the only reasons why Bauereiss uses noax IPC's. There are also economic reasons, "We simply want the units to function, 24 hours per day; 7 days a week! Availability is the primary requirement. If a computer fails, the downtimes will cost more than the computer itself. For that reason, we can only afford to have reliable computers that function even under harsh environmental conditions. We have never been disappointed by noax industrial computers. We will continue to count on noax."

"We have never been disappointed by noax industrial computers. We will continue to count on noax."



Barcodes and industrial PC's rationalize the marking of semi-processed products



Aluminium Rheinfelden GmbH

Company Profile:

The aluminum mill exists since 1898. Aluminum semi-parts, so called slugs, are produced since 1964. The responsible company branch is the Aluminium Rheinfelden GmbH Rheinfelden SEMIS. In 2005 the performance of Rheinfelden SEMIS reached 24,000 tons. The total company employs about 200 hands and generated a turnover from 165 million €.

For more information, please visit:
www.alurheinfelden.com
www.rheinfelden-semis.de

Specifications and Application

Objectives:

- ✓ In-time depiction of processes
- ✓ Improve product quality
- ✓ Optimize processing
- ✓ Improve traceability
- ✓ Secured documentation of processing
- ✓ Efficient data exchange with goods management software (SAP R3)

IPC Requirements:

- ✓ IPC operate at high temperatures
- ✓ Completely sealed (NEMA 4)
- ✓ Protection against vibrations

Overview of Components

Hardware:

- Industrial PC Steel S15
- In-house developed noax all-in-one motherboard
- Input: particularly robust touch panels
- Bright, high-contrast TFT display
- Protection class IP65 (NEMA 4)
- Completely sealed, without external fan

Software:

- Operating system: Windows embedded
- Application programs: goods

© noax Technologies
Case Study arranged 2006

Headquarters

noax Technologies AG
Am Forst 6
85560 Ebersberg (Germany)
Tel. +49 8092 8536-0
Fax +49 8092 8536-55

noax Technologies Corporation
5265 Parkway Plaza Blvd. Suite 110
Charlotte, NC 28217 (USA)
Tel. +1 704 992-1606
Fax +1 704 992-1712

noax[®]
Technologies

For worldwide locations, visit: www.noax.com or email info@noax.com