„Strong in the high-strength Al alloy and multi-material sheet product sectors“

AluReport conducted an interview with Helmut Kaufmann, AMAG's COO, concerning the value of "tailor-made material properties" and the technological strengths of the AMAG Group.

Our customers increasingly refer to "tailoring material properties". Why do they see these as important?

When, in 1886 Karl Benz took the first successful drive on a public road in Mannheim in a self-propelled wagon powered by a 4-stroke engine and seventeen years later the Wright Brothers took off for the first powered flight in Kitty Hawk, the aim was to stay in motion for as long as possible. Today, more than 100 years later, other criteria apply. Weight should be reduced in order to conserve fuel and the environment, or to allow the transport of larger loads over longer distances. Stringent demands are currently made with regard to surface quality, corrosion resistance and fatigue strength, and weldability, etc. Moreover, as there is no ideal material for every application, efforts are under way to achieve optimum results for each respective use through the targeted influencing of material characteristics.

How can the properties of aluminium be tailor-made?

The properties of monolithic materials can naturally be influenced via the composition of the alloy. Additionally, in the case of age-hardening alloys, heat treatment is an important method of exerting influence.

As far as composite materials are concerned, e.g. in the case of multi-layer, composite sheets, characteristics can be altered in a targeted manner by means of a combination of differing original sheets, or during shape casting through the use of local inserts. This involves macroscopic material areas in the end product. Composite materials are also produced by the insertion of microscopic ceramic fibres or particles into the structure of the aluminium alloys, which optimises the characteristics of the products.

How is AMAG equipped to deal with such trends?

If again we first consider the monolithic materials, we can rely on the integrated Ranshofen plant with its competent casthouse, in which first class materials are produced in line with customer wishes for subsequent rolling or shape casting and where special alloy requirements can be fulfilled. In this connection, we use a high percentage of scrap, which is environment-friendly. As far as the development of new alloys and customised adjustments to existing alloys within given standard limits are concerned, it is a ground rule that the effects of the individual alloying elements and their interaction be fully understood. In addition to experienced personnel, AMAG also disposes over the appropriate software tools for the theoretical underpinning of approaches to problem solutions and from this perspective is ideally equipped.

Optimised heat treatment with simulation support is an AMAG speciality. Today, we possess the very latest furnace technology and can flexibly heat treat both large and small batches in the batch and through-type strip furnaces for characteristic optimisation right down to individual coils or plates.

In the area of compound materials, AMAG can point to proven competence and does not merely follows trends, but partially sets them. In fact, we are in a position to both provide sheet in line with desired mechanical characteristics and forming capacity, and to furnish supplementary functions.

Could you give us some examples?

This is easy, as I am spoilt for choice. Just think of the high-strength sheets with low melt surface layers for use in brazed clad items such as coolers; high-strength sheets with a bright surface layer, which are employed on the leading edges of aircraft wings for turbulence reduction; monolithic cover layers in combination with compacted aluminium powder, and propellant core material as a basis for the

production of aluminium foam sandwich plates, e.g. for shipbuilding. Or think of the high-strength sheets with special corrosion-resistant cover layers that are utilised in automotive structures, and "Glare" material. In the case of these layered composites, aluminium sheet alternates with glass fibre reinforced plastic layers. This product is used in the Airbus A380 and we manufacture the sheet.

How are such developments achieved?

Logically enough, "tailor-made" means that one must know the desired final properties, which are first defined by the customer. Then, as a rule, we work together on achieving the required target. As a premium producer, we are ideally equipped for such development work with the involvement of strategic research partners and can furnish our clients with highly qualified advice. The probity of this approach is evidenced by recent development successes.

Many thanks for the interview. ■ AluReport