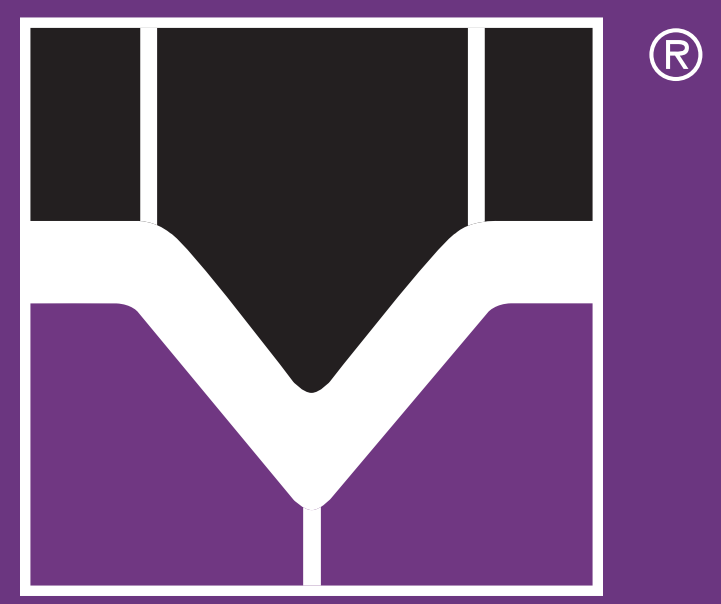


# Applications in Steel in the PV, CPV and CSP-sector

# welser profile



Ing. Albert Knotz MBA

Welsers Profile Austria GmbH, Prochenberg 24, A-3341 Ybbsitz; Phone: +43 7487 800; Fax: +43 7487 800 4942; Email: a.knotz@welsers.com

## Introduction SmartXcellence

In the business area of PV, CPV and CSP, Welsers Profile manufactures bespoke sections and section systems for a wide variety of base constructions such as pylons, module mounting structures and longitudinal supports for application areas such as building mounted, roof integrated, roof parallel, tracker systems and CSP or CPV plants. These sections are predominantly made of steel and stainless steel, because this material is optimally suited to most of our customers' products.

The reasons for this might derive from the following requirements:

- Increase of span width and optimized sections considering static demands
- Reduction of material usage by optimizing the material thickness used
- Simplification of manufacturing and assembly steps
- Adjustment to required basic conditions under consideration of ecology and economy

By using premium materials, accurate manufacturing techniques and active corrosion protection of slit edges, strip edges and punched out areas, Welsers Profile guarantees first-class and long-life sections in the field of solar technology.

The requirements associated with PV- or CSP-technology often demand new ways of thinking, due to the high level of precision and accuracy required on large scale technology. An example for CSP is replacing existing framework structures with special lightweight construction profiles as basic of mounting a parabolic trough mirror (Fig. 3). The necessary manufacturing techniques for this are available all over the world, an example being cold roll forming.

## Cold Roll-Forming

The advantage of cold roll forming processes is an economic production for sub-constructions and for large scale CSP or PV power plants. Inline processes like punching or welding are used and state of the art. Special sections with integrated mounting supports reduce the installation time.

## New Dimensions of Cold Roll-Forming – Optimization of the Strip Thickness integrated into the Production Process

The new brand 'SmartXcellence' from Welsers Profile also includes a new roll forming process, which is the answer to many requests and gives positive arguments for our customers:

- **Weight saving** due to the variation in wall thickness, optimized to meet the specification of the component.
- **Significantly reduced carbon footprint** over the complete supply chain.
- **Improvement of existing and integration of new functions**, due to thinning and thickening of the material in the cross section, such as optimization of the weld seam rating, design of the running surface ...
- **Optimization of mechanical properties:** Increased surface hardness, which in turn improves the longevity of running surfaces and telescopic profiles and tubes. An increase in strength makes the profiles more stable and increases load bearing capacity.
- **New optical design possibilities** of special sections with complex designs. The optimization of the strip thickness integrated into the process allows for a different design to opposite faces: Grooving or beading on the top face no longer excludes a flat bottom face.
- **Maximum protection against imitation** due to the exclusive design possibilities of the patented Welsers forming technique: this makes it difficult to copy your products and distinguishes them from the competition.

The basis for the newly developed process was the increasing pressure in all areas of the economy in respect of conserving resources and reducing cost, as well as the search for diversification on the market with end products. In the case of roll forming technology, a profile cross section can be optimized using a variety of techniques. The first stage is altering the material grade and dimensions. If such measures of optimization are not extensive enough, a solution could possibly be found by altering the cross section.

The graph highlights how strip material with the same strip thickness can be varied. Some of them are widely available on the market, while others are more bespoke and only apply to niche markets and some are still in development. (Fig. 5)

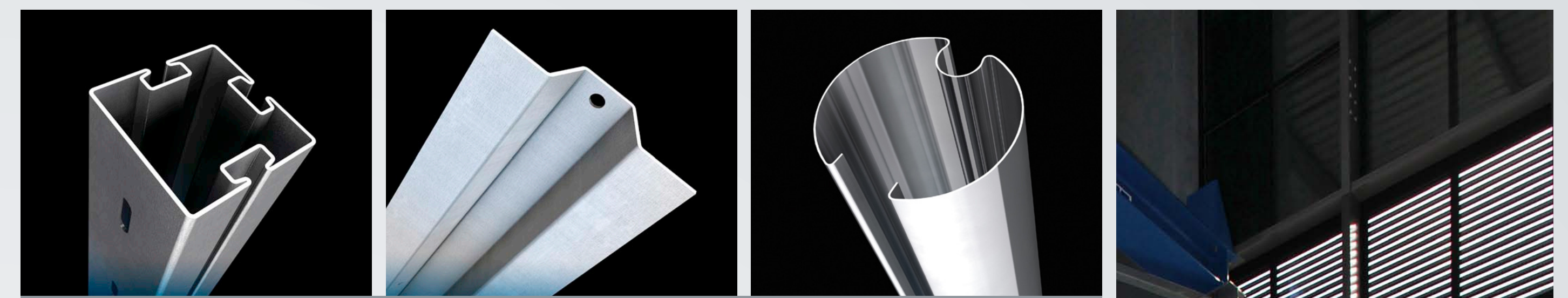


Fig. 1: Different sections for ST- and PV applications

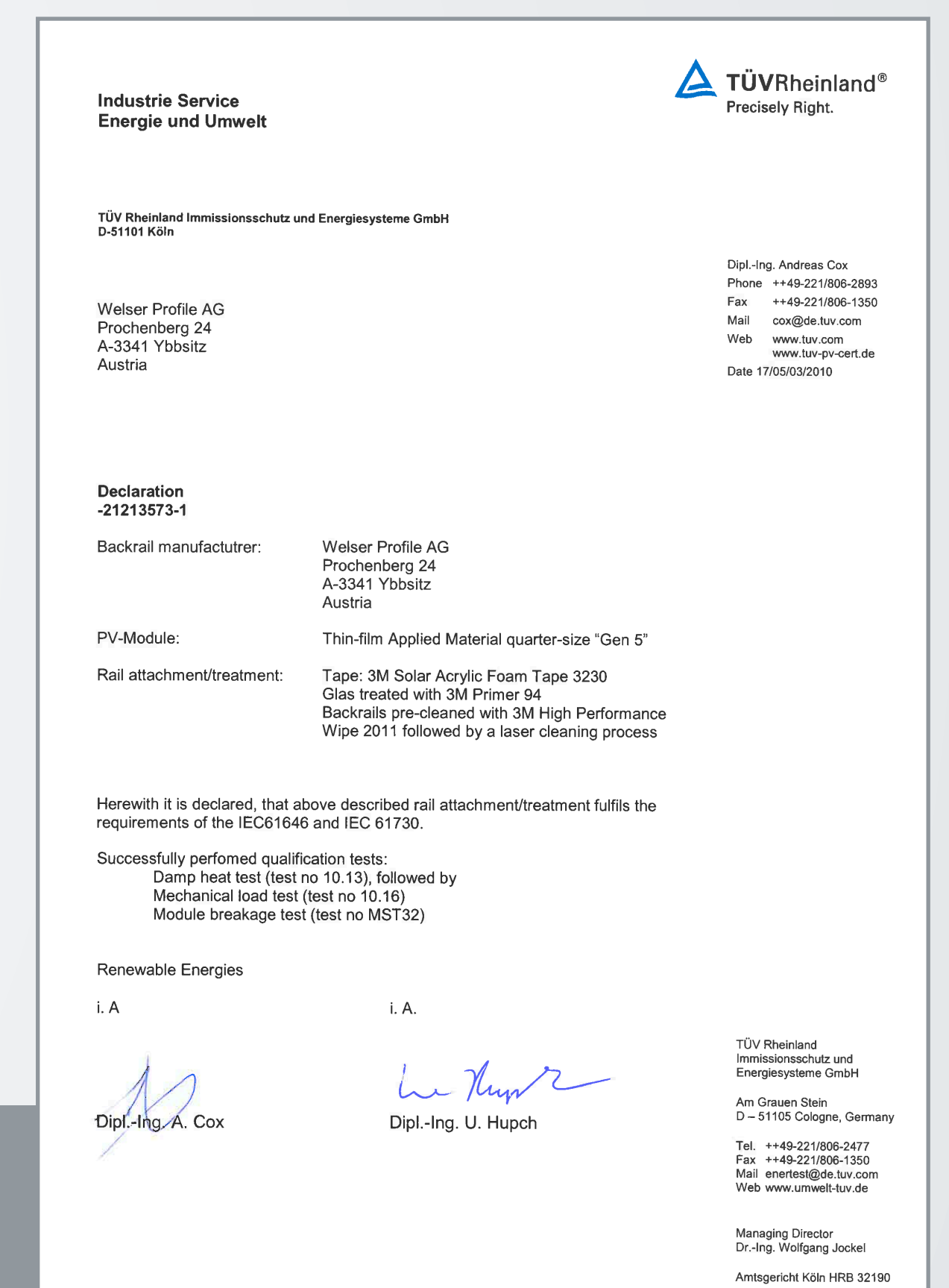


Fig. 2: RP Technik BIPV Steel Façade system (Source: RP Technik GmbH Profilsysteme)



Fig. 3: Albiassa Trough CSP Collector (Source: Albiassa Solar)

Fig. 4: Declaration TÜV Rheinland (Source: Welsers Profile)



## Applied research and development in PV and CSP applications conducted by Welsers Profile

Welsers Profile's R & D department and its business partners from the world of science and industry offer support and advice on the diverse topics presented by customers in the photovoltaic and solar thermal industry. Welsers Profile therefore provides the research community with interesting activities in the areas of metal forming, finishing and surface technology.

### Surfaces:

New materials and their compatibility with fastening elements under consideration of corrosion protection, demands an in-depth knowledge of manufacturing processes from Welsers Profile. Practical testing of some customer developments began in 2009 using a test rig of PV modules on a steel base construction.

### Bonding Technology:

This technology is often used in photovoltaics. Welsers Profile has developed an innovative solution for cleaning and surface activation of profiles, which has been certified according to IEC61646 and IEC61730 (Fig.4)



Fig. 6: Dual-axis tracking system (Source: FH FJ Wieselburg)

### Examples of the latest customer projects in 2011:

- Dual-axis tracking system with thin-glass PV laminates. Nominated for the Lower Austrian Cooperation Award - Clusterland Award 2011 - or
- FFG project in the form of an experimental development in line with the FTI initiative 'New Energies 2020 - 5<sup>th</sup> bid' (submitted).

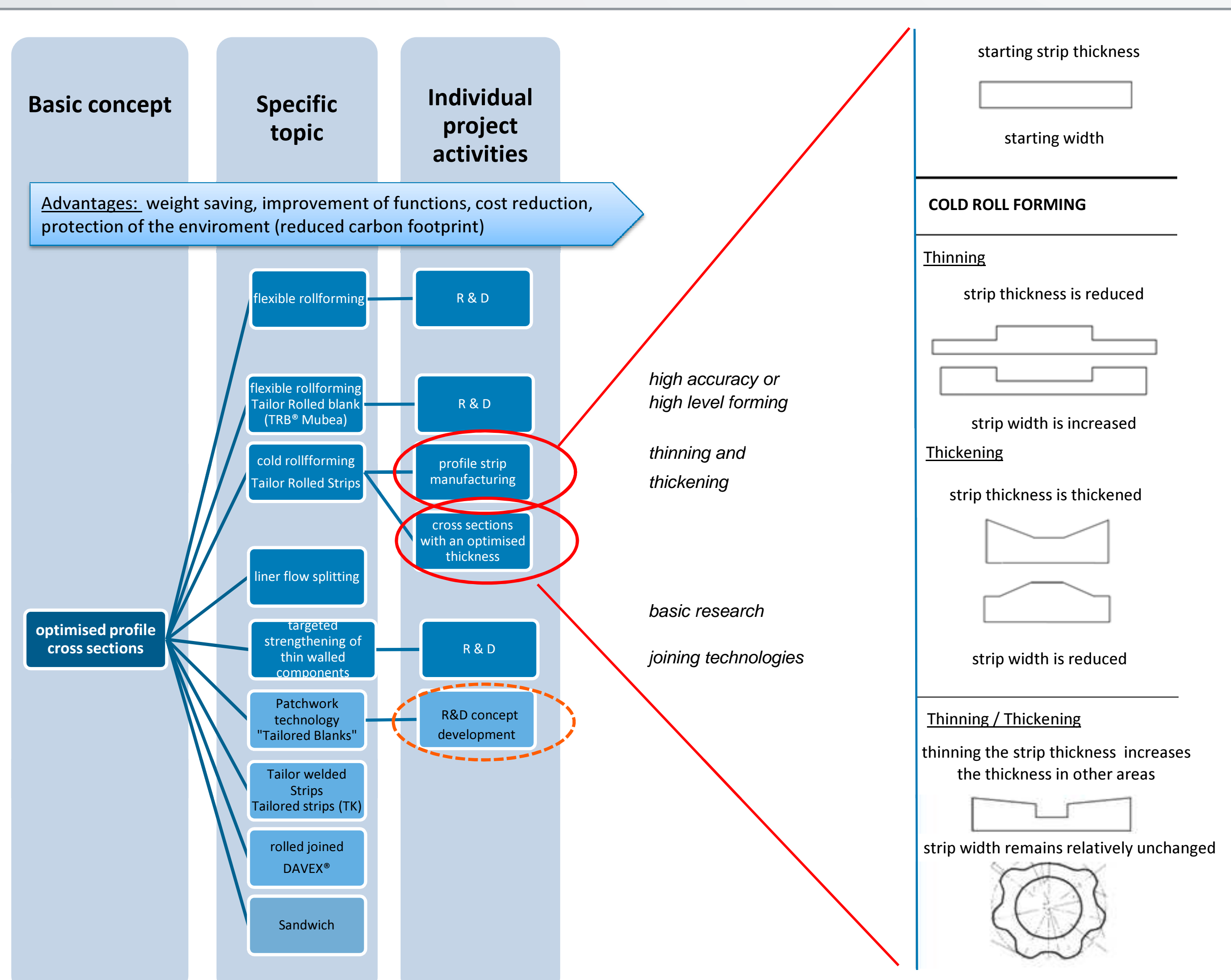


Fig. 5: Possibilities for optimization of mechanical properties and functions (Source: Welsers Profile)