

Cornet SHELL-XL:

Shaped Sheet Metal Parts in Small Lot Sizes with Large Dimensions

In recent years the demand for freeform sheet metal parts manufactured in small batch sizes down to unique parts has greatly increased. This is mainly driven by both the shift of the consumer market towards customized products as well as emerging design and production processes providing industrial designers an increased design freedom. Research towards new production processes suited to meet the market demand for increased flexibility, short lead times and extensive automation within sheet metal mainly focused on parts with limited size. Incremental Sheet metal Forming (ISF) is an upcoming production technology for which industrial examples increasingly appear on the market: patient specific medical devices (implants, orthosis ...), customization of mass produced parts (drinking bottles, telephone covers...) and prototyping (reflectors, covers, heat exchangers, ...).

However, an equal demand for customization in large sheet metal parts exists, but it still requires extensive effort to upscale current forming processes. The potential benefit of finding suitable process parameters and automation for these large parts is particularly attractive as the cost for dedicated tooling required to form these parts increases rapidly with the size of the part for conventional processes. On short term, two main sectors encounter a large demand for large customized shell structures:

- **Architecture, construction and decoration**

Requests for customized sheets can mainly be found in the construction of unique building facades, custom roof structures or monuments as well as restoration of buildings by cladding them in metal sheets.



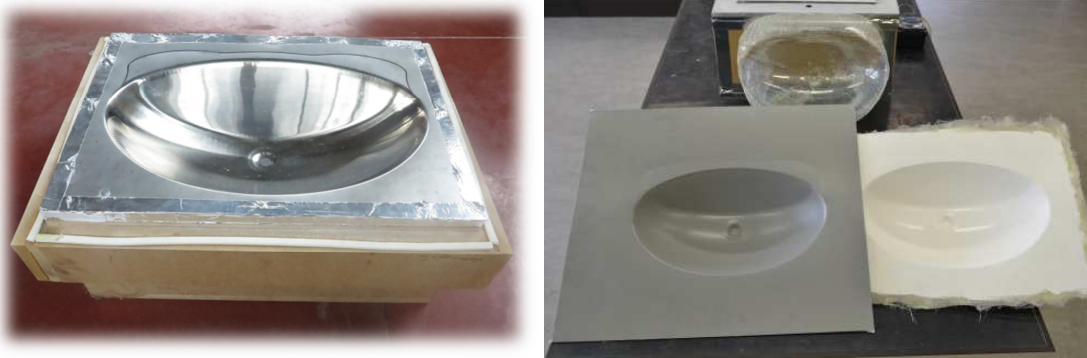
Source: MG McGrath



KU Leuven/Sirris

- **Moulding for composite and low pressure forming processes**

Large polymer and composite parts need to be formed in/over moulds. These can be made faster and lighter by forming large sheets rather than milling them from blocks. The use of sheet metal moulds also has benefits towards thermal inertia and production cycle time.



Source: KU Leuven/Sirris

Today the manufacturing of small batches of large free formed sheet metal parts is done in low automated and cost ineffective production methods, mostly requiring dedicated tooling and/or manual fabrication.

Fraunhofer IWU, KU Leuven and Sirris have an extensive background knowledge in incremental forming of sheet metal products. Within this European project SHELL-XL they join forces to develop solutions for the above industrial needs. The project, to be started in 2017 with a duration of 2 years, will deliver:

- Up scaled ISF processing, setup parameters and automation
- Guidelines for integration of sheet metal forming processes in order to increase flexibility
- Division of large and complex parts by intelligent segmentation into manageable dimensions
- Validation based on reference cases defined by case selection in the beginning of the project (categorization of typical geometries, materials and requirements delivered by the user group)

Benefits of participating to the user group

Companies can participate actively by becoming a member of the user group. Companies from the user group will drive the developments, will be actively involved in the execution and will get early access to project results. As a member of the user group you have the following benefits:

- Project developments based on the needs of your industrial cases,
- Access to all technology/know how/hardware at all research project partners,
- Quick access to all results and developments.

Participation fee

Participation in this project can be done at different levels:

- 1000€ (SME), 1500 (large enterprise): member of the user group, benefits as listed above
- Additional 4000€: idem + input of 1 company specific case (equivalent of approx. 5 days of work)
- Pro rata: idem + input of one (or more) company specific case(s) (to be discussed with Sirris)

Hereby we would like to invite you to participate in this user group. If you choose to participate we ask you to complete the letter of intent with your specific interest(s) in this research project and your willingness to participate in the user group.

If you want to receive more information or have any questions you can contact

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General project data

Submission of the proposal: 30/03/2016

Start date of the project (if approved): 01/01/2017

Project duration: 24 months

Project partners:

Fraunhofer IWU, Germany

FOSTA, Germany

KU Leuven, Belgium (<https://www.mech.kuleuven.be/en/research/flex-sheet-metal-working/>)

Sirris, Belgium