# Providing Digital Information in the Glazing Business: Challenges and Possibilities

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Imagine the front shield of your car has cracked and you need a replacement. What do you do? You go to a car glass dealer, they take the model number from your car papers and order a replacement. Easy, right?

But what do you do if a window in a building is broken? Buildings do not have model numbers. And while you might use standardizes windows for family homes, for high-rise buildings they can vary greatly as they have custom-made sizes, different tints and most of all different glass coatings that affect color hue and thermal performance. In short, a larger amount of data is required to describe a glazing unit in its entirety to replicate its design, appearance and functionality.

Now in a fully automated factory for everyday small goods collecting and storing the data might be standard, but in heavy industry this is not as easily done. Glass is delivered in pane sizes up to 18 m x 3,21 m that are then cut, edge treated, washed and dried. Depending on the desired features various processing steps can follow as the glass panes can be e.g. heated, painted, laser treated or joint together with repeated washing and drying steps in-between. In the end the panes are united to insulated glazing units with a spacer to keep them apart and glue and sealant to keep everything together and seal the unit against air and humidity. Tracking which piece of glass, spacer, glue and sealant came from which batch and underwent what kind of process without marking the glass and the final product and thus affecting its aesthetics is a challenge for glass processors. Also the processes are partly automated, partly hand work and are interrupted by a lot of intermediate storage. So the correctness of the data is relying on how diligent the involved workers document every step.

The completeness of the data is another issue as you need to merge order and production data, which are coming from different (and often very old, >20 years) software system to get the full picture. And then you need to format the data to be able to transfer it to a modern data base.

But even if you tackled all these obstacles and you have the data in a data base with a user friendly interfaces to access it. Then you still face the challenge of how to identify a glazing unit in a building to facilitate its replacement and its recycling. Before jumping to the easiest solution, a sticker with information or QR code printed on it, one has to consider some constraints: aesthetics – nothing should disturb the view to the outside, robustness - commercial buildings stand for 50-60 years, ergonomics – the access to the information should be easy, security – the information should be protected.

For the bigger picture an overview of the value chain of the construction business is given to explain why providing very detailed product and process data in a digital format and for its whole life cycle would be an added value for this sector.

Afterwards a typical production process for façade glazing is depicted to point out the challenges that the heavy glass industry faces in terms of digitalization and tracking of their materials, final products and processes.

The talk closes with a brief introduction to a tracking solution for building glazing based on radio-frequency identification (RFID). More details on this approach and how it will bring us one step towards a complete building information management, will be presented in the Poster session.

Reading material:

Background information on windows and glazing:

https://www.wbdg.org/resources/windows-and-glazing

Information of what types of windows exist:

https://www.designingbuildings.co.uk/wiki/Types_of_window

Composition of an insulated glazing unit:

https://www.pressglass.com/market-offer/glazed-units/low-emission-glass/

http://www.vitrowindowglass.com/window_glass/understanding_IGU.aspx

What does RFID stand for?

https://en.wikipedia.org/wiki/Radio-frequency_identification

Short bio: Dr. Alicia Dröge

Alicia Dröge has been working at a Saint-Gobain R&D Center since October 2016. She started as a project leader for open innovation and took over a development project at the end of 2017 dealing with the development of a digital service for building glass. Before she worked almost seven years as a scientific assistant of a professor at the RWTH Aachen University where she also took care of the public relations team of the institute. Alicia did her PhD (Physics) on „Liquid Crystals for Light Emitting Diodes“ at the University of Hull in Great Britain and has an engineering degree in Applied Laser Technology from the Applied University in Emden, Germany.