

EuroSun 2010 – SOLrose FP

The final product development of a bionical designed thermal collector

Gerhard Mütter^{1*}

¹ SOLution Solartechnik GmbH,
product development and project management,
Gewerbestr. 15, A-4642 Sattledt

Corresponding: gerhard.muetter@sol-ution.com

Abstract

Archieved goal was the final product developement of the innovative solarthermal collector SOLrose from prototype to serial production.

Enhancements of SOLrose with respect to the state of the art:

- attractive design for frontage integration
- serial production of system modules
- distribution and assembling

All planned goals were reached within the project. First we tried to start our own production line.

During the last preparation steps we got an offer to enhance an existing roboter production line.

The collector is in serial production since July 2010.

The project for the FINAL PRODUCT DEVELOPEMENT was supported by the FFG.

1. Introduction

According to the targets of “Solarthermie 2030” of the ESTTP and the “paper for an Austrian research and technology program” of the ASTTP.

SOLution Solartechnik GmbH developed a collector to a prototype which has many improvements compared to the present technical state of the art.

2. Target

Target of the work in this FFG-project was the final product development for serial production.

We wanted to develop our own collector because it will help us to get in a market-leading position in the sector of solar thermal systems.

For the significant innovations there is registered a utility model at the Austrian Patent Office under GM662/2007.

To design the SOLROSE-collectors we used the experience of more than 10.000,00 installed solar systems especially experiences in logistics, transport and assembly.

2.1. bionical design

The goal was to create a collector that is

- more efficient
- useable as a design element
- cheaper to produce

than the state of the market.

As in many other successful projects we took the nature as an example.

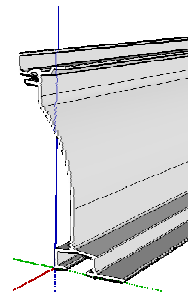
The SOLROSE collector opens up like a rose to the sun.

We created a special profile that have a more astetic look and opens the collector to the sun.

Because of this bionic detail of the SOLROSE collector the utilisation of the sunlight is higher than from other current collectors. With a $\eta_{0,809}$ we reached the goal „more efficient“ than the market.

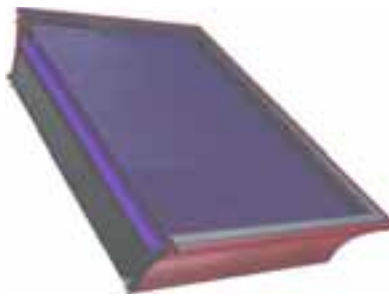


The rose as inspiration for the design



First version of the profile

The mounting components can be hidden under the parts facing the sun. That means several modules can be installed as a plain surface. In the architecture SOLROSE can be used as a functional design element. This also corresponds to the visions of “Solarthermie 2030”.



SOLrose

design study SOLrose

product logo

exhibition table for SOLrose

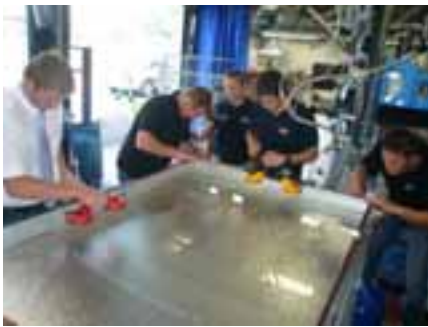
The most extensive part of the project was the enhancement of the production process and the adaption of a production line to get reproducible quality.

Parallel to all this jobs we got all necessary Certifications like SOLAR KEYMARK and AUSTRIA SOLAR GÜTESIEGEL.

2.2. method of treatment

- Tests with all components
- Check of residual risk on prototyp an preliminary parts
- Certification for admission on the market

The result of the test and check were a lot of small improvements in nearly every component of the collector. One major step was using the new technology of bonding the glass. A technology that is already used for front windshield in automotive but that is relatively new to take place in collector production. With a lot of tests we got results that makes this technology usable for collectors and that also gives attractive looking design.



The expert group for bonding tests



equipment for bonding tests

As a main part of the project we tried to design the production line with a minimum of manpower and equipment cost. Therefore we took a lot of information from the Toyota Production System [1][2] to get the workflow optimized.

One astonishing detail was the effect that the creation of a 1:1 model in wood / carton made for us.



1:1 model made of wood / carton to analyse the working steps of the production

By building this model we got perfect values for all handling steps during the final production of the collector. We reduced the time to get additional technicians ready to work in the project to 30-50% of the time we needed before we got this model. We stopped all handling steps by playing the production in pantomime and video taped this. This helped us to reduce some handling steps and to balance the manpower in the production line.

2.3. Results

- Target was the final product development, that means to get all components ready for serial production
- All targets were successfully reached

As main result we got the production line ready designed and we now are able to produce every 1:40min a collector.



View to a part of the robotor line, foreground : bonding roboter, background: glass mounting

We enhanced an existing production line by enhancing the following parts:

- Enhancement of 39 work piece tablets
- Additions on every work holding device
- Pneumatic, sensor technik
- Special software components for the bonding roboter

Also result of the project was a lot of technical details to reduce costs and to get the production process steady and homogenius.

5. Conclusion

The project showed us that detailed planning and testing combined with permanent contact to specialists of handling the technology improves a product to a new quality.

The support by the FFG helped us to differ from the market and show Austrian quality and innovation spirit.

References

[1] [Taiichi Ohno](#): *Das Toyota-Produktionssystem*, Campus 1993. [ISBN 3-593-37801-9](#).

[2] [Jeffrey K. Liker](#): *The Toyota Way*, McGraw-Hill 2004. [ISBN 0-07-139231-9](#).