

3 D Litecomp Sandwich Light Weight Technology- Test on large Automotive Structures



Project within Sustainable Production Technology

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Executive summary

The project goal is to test manufacturing of a 7 m bus side using 3D Litecomp technology to evaluate production rate and product properties. 3D Litecomp is a sandwich technology developed at Chalmers Industrial Technology. The technology makes it possible to manufacture strong light stiff structures in complex shapes with high-energy absorption and variable sandwich core thickness. The technology can be used in Light RTM or RTM for manufacturing of outer and inner fiber glass skins. The technology uses environment friendly material like soybean based polyester and fiberglass. It is a closed technology with minimal emission. Sandwich material is in the form of polymer spheres 3-6mm. Spheres are hollow with variable wall thickness. The technology makes it possible to integrate functions and hollow area for electric

harness, pipes, steel/aluminum reinforcement. Focus in the project is the production technology to cover the spheres with a layer of polyester and fill the sandwich material (spheres) fast enough to be able to produce 5 - 10 large structures per hour. We are going to patent the technology that will be fully automatic. The goal is manufacture environment friendly, cost effective, energy absorbent (crash), light body structures in medium production volumes - type Buses and Truck Cabins. The result is that we could with our developed equipment fill 50 liter core material per minute. In production is 30-35 liter per minute more realistic due to start och stop. We can fill a 4 kvm bus side modul with average 30 mm core in 4 min which was the goal. We will in next step try to shorten the cycletime by a combination of sphere filling with a new polymer foam with similar strength.

Background

Buses need to be much lighter to be able to use electric or hybrid drivetrains. The chassis are difficult to build lighter so the only area that can be built lighter is the body. Composite bodies with core material is a solution but today's technology is not suitable for medium production volumes. 3 D Litecomp technology can be the solution. We have therefore tested the technology on a bus side - a large Automotive structure.

Objective

The goal is manufacture environment friendly, cost effective, energy absorbent (crash), light body structures in medium production volumes - type Buses and Truck Cabins

Project realization

We built a test filling equipment together with Trelleborg and test run it. After that tested we how to build a modular bus side at Coman Bus. We tested process time and production cost.

Results and deliverables

The result is that we could with our developed equipment fill 50 liter core material per minute. In production is 30-35 liter per minute more realistic due to start och stop. We can fill a 4 kvm bus side modul with average 30 mm in 4 min which was the goal. We will in next step try to shorten the cycletime by a combination of sphere filling with a new polymer foam with similar strength.

Delivery to FFI-goals

- Increased competitiveness
 - Secured by high flexibility, lag vikt och laga kostnader (material, utrustning, verktyg, mantid)
- Environment friendly products and production
 - Secured by light product, environment friendly material och and closed process
- Patents
 - Parts of the technology can be patented
- Industrial technology- and competens development
 - The project has fulfilled these goals

- Secure employment, growth and increased R&D
 - When implemented will these goals be fulfilled

- Concrete production improvement at participant companies
 - When implemented will these goals be fulfilled

- Strengthen research areas within production technology in the FFI -program
 - That the project reach the goals secure fulfills the goal

- Efficient use the research results for concrete production improvement at the participation companies
 - The companies has done improvement based of the research result

- Raise the quality in production education
 - Goal fulfilled by courses to companies

- Strengthen cooperation between the Automotive industry, government, universities and research institutes
 - Spin off project med Volvo buss, Masterform and IMIT

Dissemination and publications

Knowledge and results dissemination

The need for light cost effective bus bodies will get the technology implemented as soon as possible. Joining technology must be further developed to be able to fast join modules together. We will hold 2 day courses for companies how be able to design products and build production units based on the technology.

Conclusions and future research

We can fill a 4 kvm bus side modul with average 30 mm in 4 min which was the goal. We will in next step try to shorten the cycletime by a combination of sphere filling with a new polymer foam with similar strength.

Participating parties and contact person

Trelleborg AB - Dr. Gary Gladysz VP development
Coman Bus - Klas Norrbohm President