From a BIM model to a products

Punkaharjun Puutaito Oy

- Founded in 1989 in Punkaharju, which has grown from a ”carpenter workshop” employing three people to an industrial plant employing over 40 people. The company is relying on high quality, continuous products development and reliable delivery time.
- Three business areas:
  - 1. production of wooden packaking materials for the paper and cardboard industry.
  - 2. CNC-machining services for plywood-, LVL, CLT- and glulam-industry.
  - 3. demanding wooden structures and elements for constructions.
- Our customers are globally operating forest industry companies, as well as Finnish construction companies.
- The end-use destinations of our products are all over the world. We do continuous developments of our production methods.
- In 2022, the turnover was 7,6 million euros.
- We have approx 10000 m^2 production space.

The products

- Single-use sheet pallets for the paper and cardboard industry. We manufacture more than 200 000 pallets annually with two automatic asseblylines.

- Roller plugs for the paper and cardboard industry.
- Raw material for the plugs are plywood.
- Wooden plugs can be recycled for reuse or for energy.

The products

CNC-machining

- We specialized in further prosessing of plywood, Glulam-beams, LVL and CLT-boards.
- In 2018, a third CNC machining center was invested, which also enables the machining of three-dimensionals pieces. The maximum lenght of the piece can be up to 33 meters and max width is 4 meters. The max thickness is 300 mm.
- Approximately 50 000 – 60 000 m^3 of board products are produced annually on our production lines per year.

Two ways from BIM to product

- There are no btl-format available.

The complex way to export the data to the CNC-machining centre!

- Using the btl-format to export all the data to the CNC-machining centre.

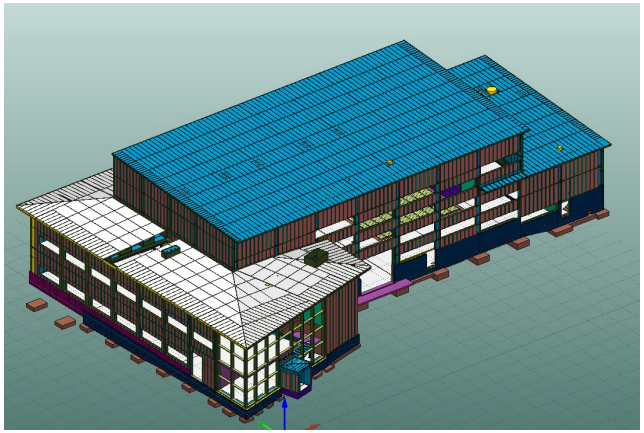
The easy way!

No btl-export available

- The complex way:
  - The model is exported only in IFC-format.
    - There might be limitations for importing IFC to CAM software
  - The model is exported to dwg-format for CAM-programming.
    - The dwg-format the model is not complete or something data is missing.
    - All the machining operations must be programmed by manually, which increase the risks of human errors.
    - Production flow decreases due to human errors.

No btl-export available

- Xamk, Wood construction laboratory:
  - The model was exported in ifc and dwg-format.
  - For the CAM-software, all the data had to be exported in dwg-format.
  - All the assembly or part codes didn`t transfered by the dwg-format.



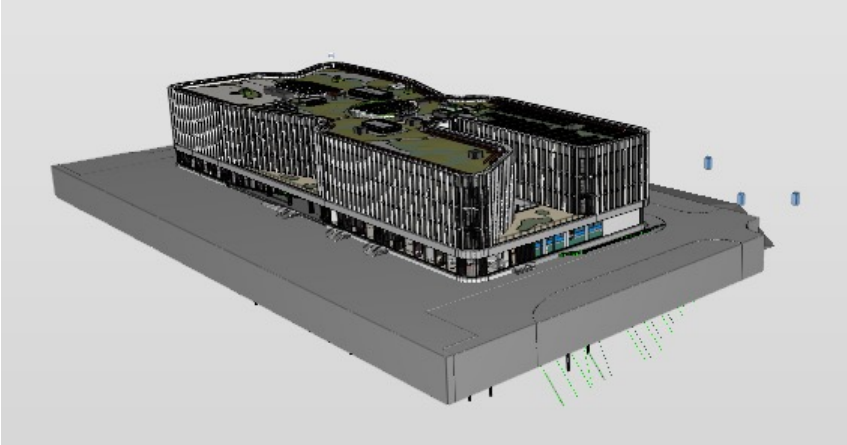
In this model we had 4478 parts, but we didn`t know the identefication codes from the model. The missing information had to be cross-checked between ifc and excel-lists by manually.
Again, risk of human error!

Using the btl-format

- Requirements
  - The CAD-software must be able to export the btl-format.
  - The designer must know the features of the CNC-centre and existing tools to be used.
  - The CAM-software must be able to import the btl-format.
  - The configuration must be complete in CAM-software for automatic programming.
    - All the tool data must be correct and equal between CAM-software and CNC-interface.

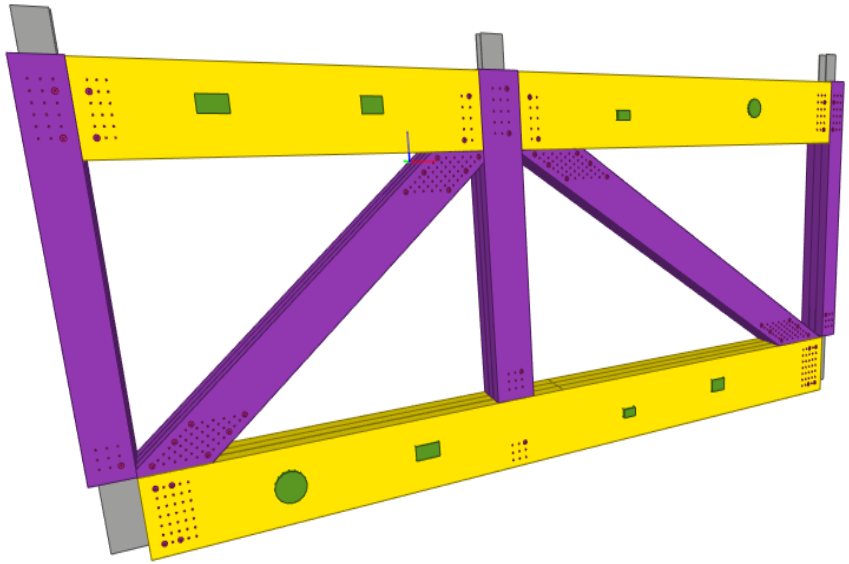
Using the btl-format

- Case ”Katajanokan laituri”



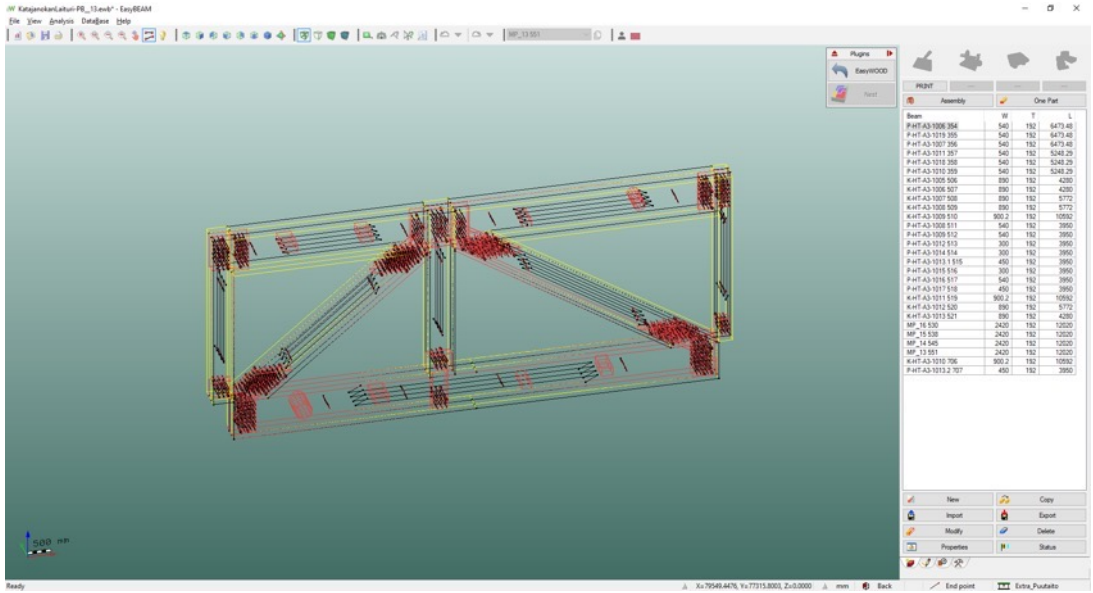
Using the btl-format

- Reinforcement truss in ifc-format
  - Dimensions:
    - Lenght: 11342 mm
    - Height: 5254 mm
    - Weight: 9000 kg



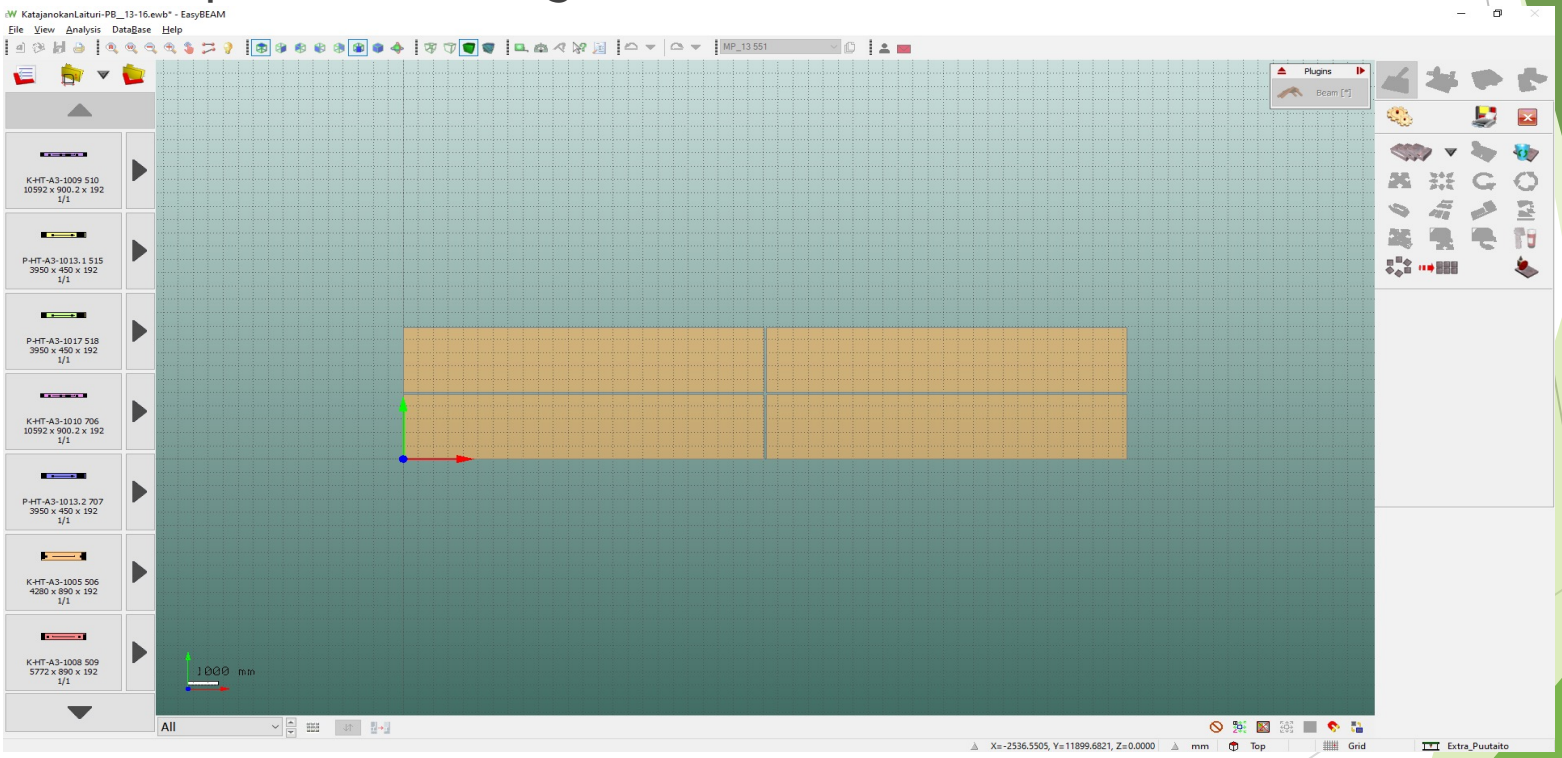
Using the btl-format

- Reinforcement truss
  - All the data is imported to CAM-sofware by btl-file format.
  - The truss consists by 24 different LVL-components.



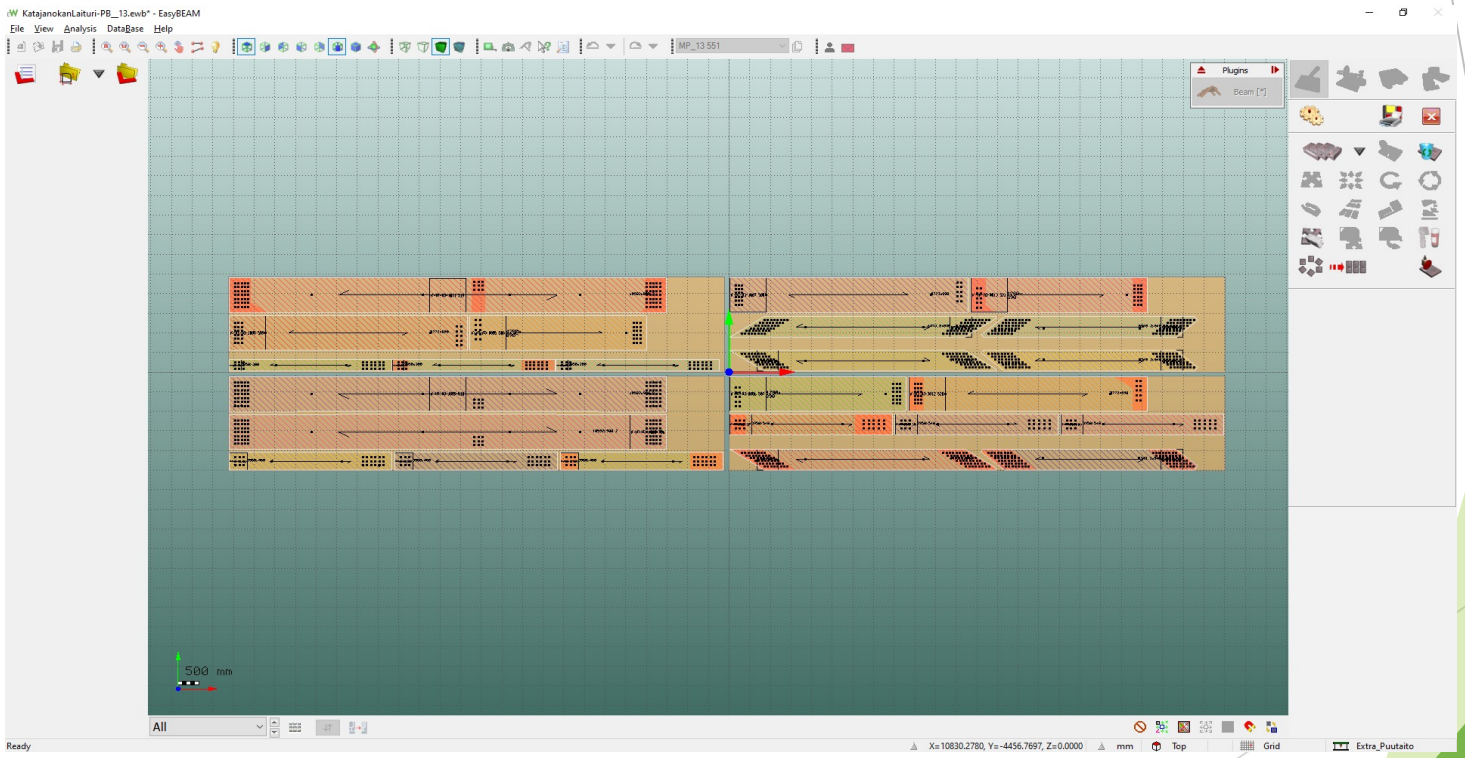
Using the btl-format

- The parts are waiting to be nested.



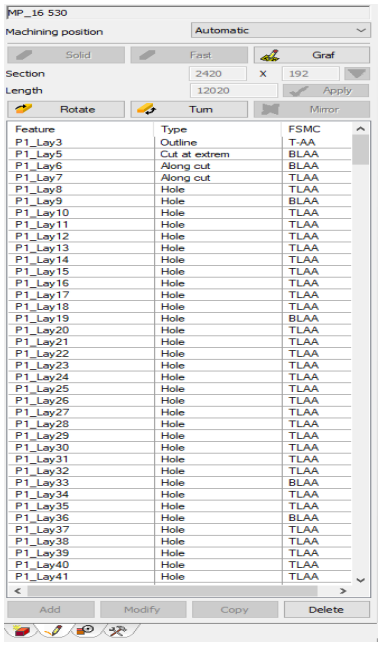
Using the btl-format

- The nesting of every components are done automatically based from the btl-data.

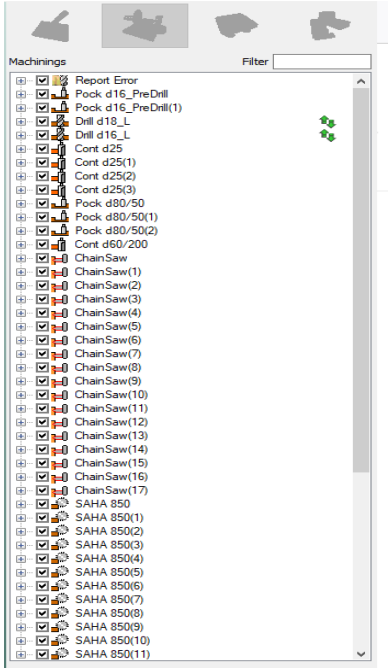


Using the btl-format

- Every machining features are analyzed by the CAM-software.

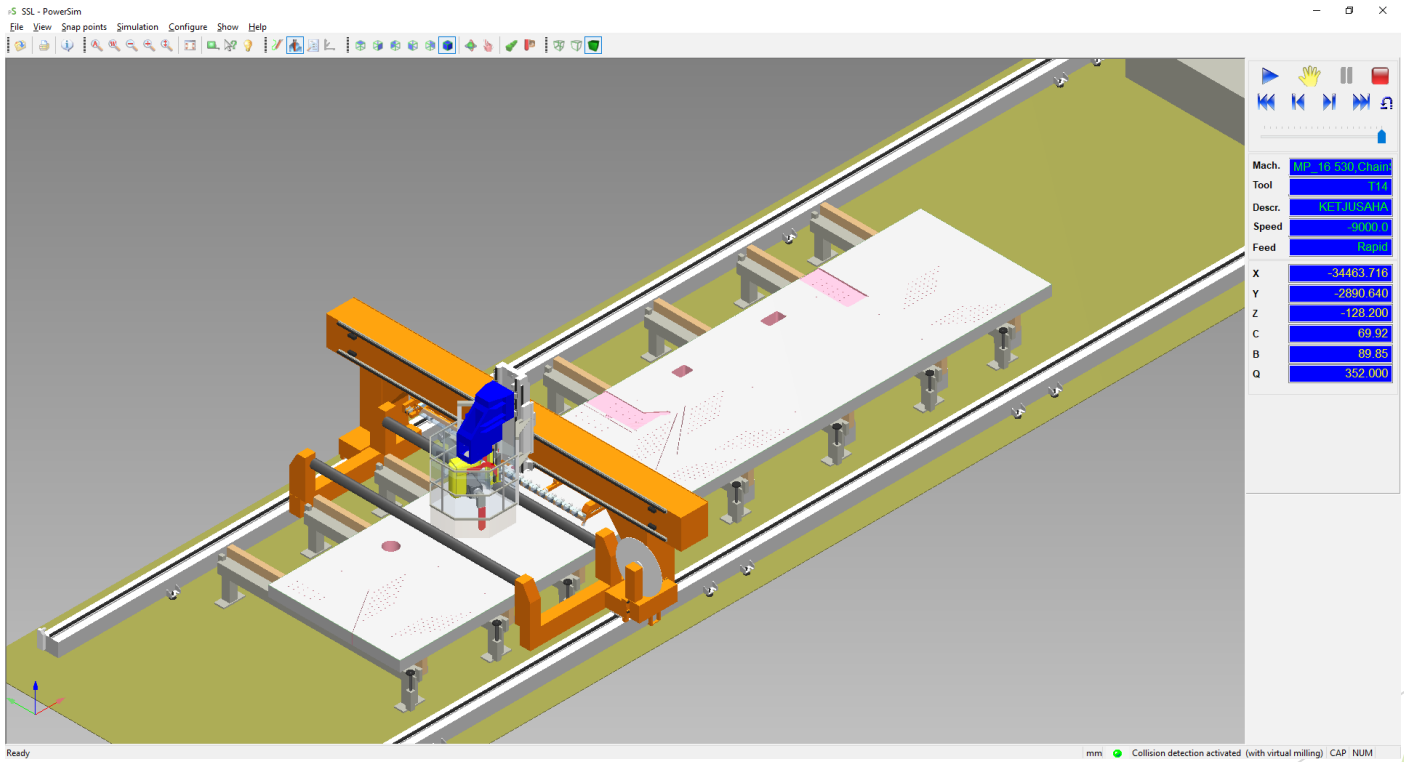


- The machinings are automatically programmed based on the btl-data.



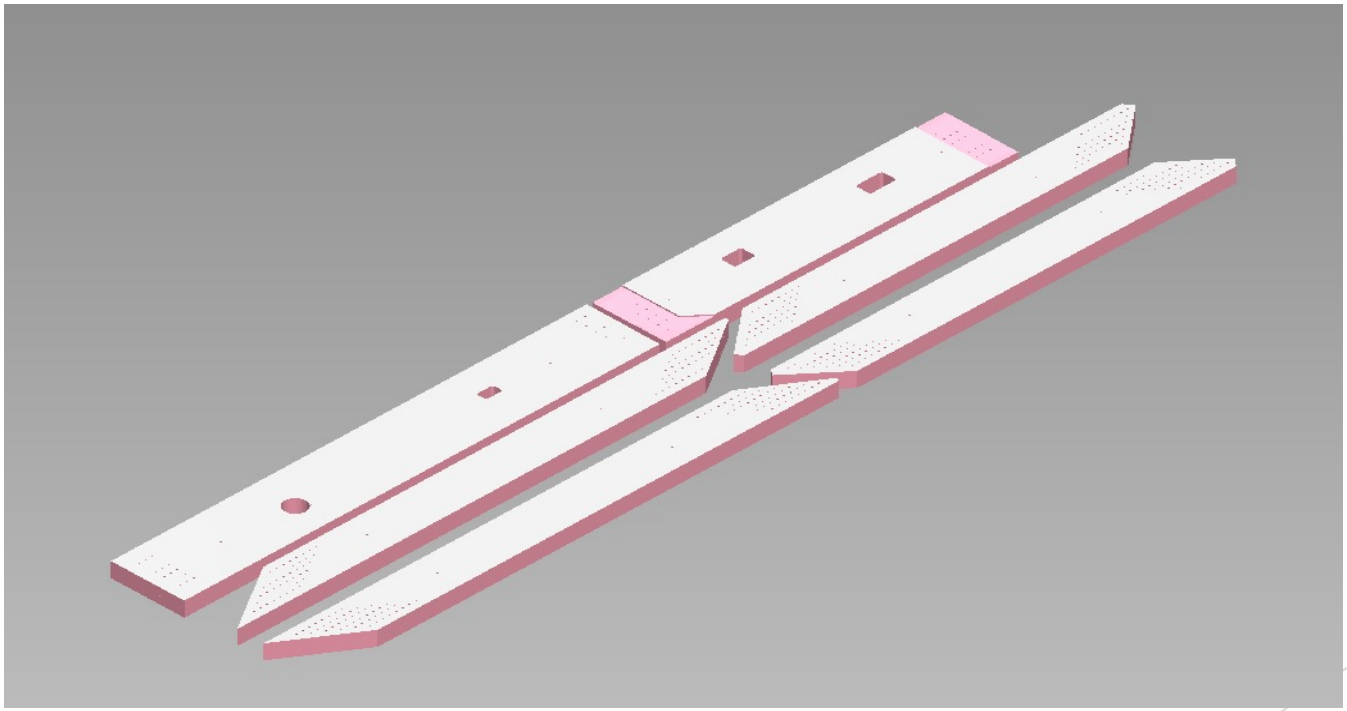
Using the btl-format

- CNC-simulation:



Using the btl-format

- Machined components.



Using the btl-format

The CNC-machinecenter

- Biesse E Mix
  - X=33000 mm, Y=4000 mm, Z= 300 mm (max thickness), C= 360°, B=210°

Summary

- Benefits of the BTL:
  - Production flow increases
  - Better quality > no human erros
  - Cost effective
- In future, there should be cooperation network between educational institutions, design offices and manufactures.

Thank you