Gluing Technology
Recent European Developments

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Structural Wood Products
Products in use

Gluing technology
Recent European development

- Industry development
- Market
- Recent adhesive history
- Adhesive types and wood species
- Adhesive properties
- Washless
- Computer programs
- Separate application finger jointing
- RF-properties
- Future perspective
Industry development 1990 - today

- From craftsmanship to industrial production
- Increase in production capacity
- Sawmills want to add value
- Market growth
- Change in building regulations
- Change in distribution channels
- Emerging markets
- Overseas exports

Production of glulam in Europe
Market

- EWS market has grown faster than the economy since 1990
- Entrance barriers are high and gets higher
- Customers are technology driven
- Customers pay for technology improvements and flexibility
- Faster and more flexible systems are required
- Price pressure due to tough competition.

Recent adhesive history - Europe

- 1970  MUF system – dark color
- 1987  MUF system – powder, first light-coloured adhesive type 1
- 1993  Two component; liquid/liquid
- 1994  First PU
- 1995-1999 Several MUF systems
- 2003  Washless
- 2005  First EPI as adhesive type 1
- 2009  The most flexible MUF ever
Adhesive types and wood species

- MUF
- MF
- PRF
- PU
- EPI

- Spruce (Picea abies, Abies alba)
- Pine (Pinus sylvestris)
- Larch (Larix decidua)
- Other species in smaller quantities, including hardwood

Market shares

1990

2009
MUF development

- 3-component to 2-component
- Dark to light glue lines
- Improved storage stability
- Long to extremely short pressing and after curing times
- Mix-in to separate application
- Wash water handling to "no" wash water
- Fixed systems, low flexibility to high flexibility
- Strong smell to low smell of formic acid

MUF - Development

![Chart showing 3 generations of MUF with pressing time and after curing time in hours]

Gen

0 2 4 6 8 10 12 14

Hours pressing time

0 50 100 150 200 250

Hours after curing time
Pressing time vs. hardener ratio: high flexibility

- From 90 minutes pressing time @ 20°C
- Up to 150 minutes closed assembly time @ 20°C
- Mix-in and fixed hardener ratio
- Gap filling properties
- Special applications
- Japan
EPI

Prefere 6151 with hardener Prefere 6651

- Tested according to EN 301 and approved for the gluing of load bearing constructions
- 5-30 minutes pressing time @ 20°C
- Up to 30 minutes closed assembly time @ 20°C
- 45 minutes pot life @ 20°C
- Gluing at temperatures down to 5°C

PU

- From 10-15 min pressing time @ 20°C and 12% WMC
- Up to 60-70 minutes closed assembly time @ 20°C and 12% WMC
- Sensitive to high density wood species
- Sensitive to wood moisture
- Gluing of wood against other materials
- Gluing of wet wood
Washless adhesive application system

• Separate application of glue and hardener
• No pot life requirement
• Minimum cleaning
• Minimum waste and wash water
• Patented by Dynea
Computer programs

- Dynea CureSafe system will find the correct pressing time and assembly time at different temperatures.

CureSafe

With lamella temperature at 23°C the pressing time can be reduced by 24% compared to lamella temperature at 20 °C.
Machine solutions finger jointing

- Separate application Matrix or Rollers
- Premix
- Mix-in
- Contactless (PU)

RF-properties

- Curing with radio frequency came approx. 50 years ago.
- Really efficient, stable and reliable RF-presses came 15 to 25 years ago.
- Since then, the development has slowed down
RF-properties

• Typical factors 10-15 years ago:
  – Glue line curing capacity: 5-10 m²/min
  – RF-factor: 30-35 KW/m²

• Typical factors today:
  – Glue line curing capacity: 15 m²/min
  – RF-factor: 15 KW/m²

• Reduced temperature in the glue line and wood:
  – More stable products

Future perspective

• Faster cold curing lines and adhesives

• Introduction of "new" wood species: Beech, oak, Maritime pine etc

• Increased use of modified wood:
  - Acetylation
  - Furfurylation
  - Thermal treatment
  - Etc

• Gluing of wet wood
• Contactless application (EPI/MUF)
Thank you for your attention!