Perspectives and Challenges of the Woodworking Industries in Europe
- Porto 12.7.2017 -

REF WOOD experience
French implementation
French WBP implementation of the REF WOOD’s objectives

• According to the prevention of Formaldehyde exposure at the workplace, the wood industry is challenged on three aspects:

1. The wood used into the process which is naturally Formaldehyde emitting and not substitutable;

2. The control of the worker’s exposure to FA at the workplace according to the French legislation;

3. The scientific research to substitute formaldehyde in the resin.
1. The wood

Formaldehyde emission of the pure wood samples by PV method EN 120

<table>
<thead>
<tr>
<th>Wood species</th>
<th>mg/100 g</th>
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</thead>
<tbody>
<tr>
<td>Pine</td>
<td>0.15</td>
</tr>
<tr>
<td>Birch</td>
<td>0.08</td>
</tr>
<tr>
<td>Beech</td>
<td>0.06</td>
</tr>
<tr>
<td>Oak</td>
<td>0.09</td>
</tr>
<tr>
<td>Spruce</td>
<td>0.10</td>
</tr>
</tbody>
</table>
1.1. Substitute to wood

• What is a panel made with?
  • 50% Round wood
  • 20% Sawmiller’s by products
  • 10% Sawn
  • 20% Recycled wood

✓ No substitute to wood
2. Control of FA workplace exposure - national FA regulation

• 2001 - Special rules in the French regulation for preventing exposure to carcinogenic-mutagenic-reprotoxic substances.

• 2006 - Formaldehyde has been assimilated to carcinogen agent in France.

• 2004 to 2014 - Monitoring campaign on WWI’s plants conducted by independent labs; results were collected and checked by a scientific body (INRS)

• 2012 - UIPP, the Plywood’s, the Furniture industry and the Wood Construction Federation concluded a convention with the ministry of Employment, INRS and the workers social insurance (CNAMTS) targeting the same objectives as REF WOOD.

• 2016 – French regulation was ready for the reclassification of Formaldehyde as CMR, monitoring of the plants is reinforced.
2. The FA convention with the ministry of Employment

3 mains objectives based on commitments from the 3 parties involved:

1. Raising awareness and informing employers on the risk for being exposed to FA

2. Informing and training workers the same way

3. Providing technical backup by the scientific body INRS
2.1. Information and awareness

For the employers:

• Providing of leaflets and information guides
• Organisation of information seminars

For the workers:

• Benchmark model established by INRS and CNAMTS for the training on chemical risks at national level
• Trainings of workers
2.2. Technical backup

Both Panel’s plants and INRS were committed to realise the followings:

• Risk assessment at workplace

• Evaluation of the concentration of FA at workplace with a measurement strategy elaborated by the Plants and INRS

• Evaluation of the monitoring results by INRS collected via a national public database

• Extension of the methodology to the whole plants

• Feedback analysis and determination of the BAT

• Association of the parties for the research in FA substitution
2.3. Monitoring campaign

A monitoring campaign was launched on the 16th plants of our Union:

• Control of the EOL-LT 8h and EOL-15mn

• 13 Homogenous exposition group defined according to the level of exposure with a zoning distinction between hot and cold areas

• The laboratory in charge of the collection strategy, the collection and the analysis was selected after a call for tender

• The terms of reference were addressing Panel’s specifications as regards the type of process, the work organisation and the climate in the plant’s zone
2.3. Results of the monitoring campaign

• Overall results:
  • 63% (10 /16) – conformity with existing OEL
    • 19% - (3/16) – conformity with the 0.3ppm

• By Homogenous Exposure Group:
  • 66% - conformity
    • 50% - conformity with the 0.3ppm

• Significant differences between hot and cold zone

• No clear impact according to the nature of the resin used in the process
2.4. Next

- New campaign elaborated with INRS for the hot spot with high exposure

- In order to determinate BATs

- The campaign is ongoing
3. Research in FA substitution

2009 First research project launched by UIPP with RESCOLL to source substitutes

- Established that Kraft lignin has a good potential for cross-linking

<table>
<thead>
<tr>
<th>Matières Première</th>
<th>Origines</th>
<th>Types d’adhésifs</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanins</td>
<td>Tanins condensés</td>
<td>Partiellement biosourcé associé à une résine conventionnelle d’origine pétrochimique ; substitution du phénol (PF)</td>
<td>PP, MDF, CP, OSB</td>
</tr>
<tr>
<td>Lignines</td>
<td>Co-produits issus du secteur papetier : Kraft, organosolv, …</td>
<td>Lignines combinées avec des résines conventionnelles (PF)</td>
<td>PP, MDF, CP, OSB</td>
</tr>
<tr>
<td>Protéines</td>
<td>Protéines isolées de protéagineux</td>
<td>Protéines combinées avec des résines conventionnelles</td>
<td>PP, CP, OSB</td>
</tr>
<tr>
<td>Furfural</td>
<td>Dérivés des hemicelluloses</td>
<td>Résines furanniques</td>
<td>PP, CP, MDF, OSB, Matériaux compressés</td>
</tr>
<tr>
<td>Huiles végétales</td>
<td>Huiles végétales modifiées</td>
<td>Huiles époxydées ou maléinisées</td>
<td>MDF, Panneaux isolants</td>
</tr>
</tbody>
</table>
3. Research in FA substitution

2012-2015 Research consortium to test kraft lignin
   • No partial or complete substitution with biosourced without losing panel’s mechanical and environmental properties
   • Bad VOC Emission level of the panel: C class

2013-2016 Research project with a patent process on agricultural waste
   • Non sustainable modification of the process = lowering of the press temperature
   • No reproduction of the laboratory results during the process
   • No toxicologic study provided on the source because of the patent

2017-2018 FCBA testing campaign on existing biosourced resin
   • Targeted resin are selected
   • Difficulties to obtain the sampling because of the patents
   • Refusal for comparative study because of the patents
Conclusion

• On the management of the risk at the workplace
  ✓ Access to the hot spots are strictly limited and requires personal protection equipment
  ✓ Press are provided for with effective aspiration and abatement system
  ✓ But the issue also relies on the willingness of the workforce to comply with the standard of prevention

• On the emission limit value at the workplace
  ✓ The Panel’s promote the SCOEL 0,3 ppm as it corresponds to the realistic BAT that would harmonise measurement within the whole WWI otherwise prevention investment could be limited to the biggest plants

• On substitution
  ✓ This is an ongoing process that requires big investments to fill the Panel’s needs as regards the volume of resin consumed yearly
  ✓ Substitute FA should prevent the rise of any toxicological issue

• On BATs
  ✓ French Panels, Wood Construction Federation, the National Construction Federation and the Craftsmen Federation are part of a research project to monitor Prevention of risks’ BATs relying on the Industry 2.0 framework