Client Report :

Barriers to the enhanced use of wood in Europe: Particular attention to the regulatory barriers

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Executive Summary

This work was devised and designed by the EU **E**nhanced **U**se of **W**ood **W**orking **G**roup (EUW WG) and carried out by the Building Research Establishment (BRE) as a part of the "Roadmap 2010" programme of the European Confederation of Woodworking Industries, CEI-Bois. The overall aim of Roadmap 2010 is to produce an up-dated analysis on key factors and challenges affecting the wood industry, to identify the opportunities available and ideal market positions, and to produce an action programme for the European woodworking industries as we move towards 2010.

Following development of the terms of reference of this project by the EUW WG during the first half of this year, BRE was invited by CEI-Bois to submit a proposal concerned with 'Barriers to the enhanced use of wood in Europe: particular attention to the regulatory barriers to building with wood'. The "Enhanced Use of Wood Working Group (EUW WG)" is an ad hoc body, established in 2001 under the auspices of the Advisory Committee on Forestry and the Forest-based Industries. The Committee, the EUW WG and other working groups are managed by DG Enterprise of the European Commission. The EUW WG has also acted as steering group for this work and provided technical and administrative input to the project.

This work, as part of the global project 'Roadmap 2010', aims to facilitate the increased use of wood and wood-based products in general, but particularly in construction. It identifies barriers to the use of wood in Europe, not only for generic wood-framed building types, but also for innovative wood-based construction products that may form the future of the wood construction industry. In the scope of this work a "barrier" was defined as being a regulation or requirement which prohibits the use of wood and wood-based products in a certain application. In contrast to this "limitations" were defined to being regulations or other requirements which allowed wood to be used but imposed certain conditions to its use.

A survey template was designed to identify the regulatory barriers to building with wood throughout Europe. This questionnaire was sent to national correspondents in 24 European countries and mainly concentrated on the use of wood and wood-based products in residential construction (i.e. single-family housing but also multi-occupancy dwellings). It covered walls, floors, roofs and general questions about the external use of wood, thermal and sound insulation, wood treatments, disproportionate collapse, certified wood requirements and novel engineered wood products. It also briefly covered other barriers to the enhanced use of wood, categorised into institutional, technical, economic and perceptional issues.

The project has concluded that at the moment there are no regulatory barriers to the use of wood or wood-based products in the construction of residential buildings. This is mainly due to that fact that governments, through their regulations, cannot be prejudiced towards any particular material. Despite this there are many limitations to the use of wood and wood-based products, which could act as barriers if not addressed in the

future. Therefore the industry must not be complacent about this issue and should take active steps in the development and inception of regulations and requirements. Especially the European harmonisation process sets new challenges and here the industry should monitor and also actively participate and influence on the decision making process.

As regulatory requirements are functional and not prescriptive, in almost all European countries, any material can be employed as long as the functional requirements can be met. However, there are many limitations to the use of wood and wood-based products, which need to be addressed and ultimately eliminated. Many of these barriers have been identified and reported in Section 4. One of the main regulatory limitations to the enhanced use of wood-based products in residential construction relate to the fire resistance and sound insulation specifications, specifically when materials / building elements are used in multi-storey and/or multi-occupancy residential construction. For single-family dwelling construction there are no substantial limitations to the use of wood and wood-based products. Other barriers, categorised into institutional, technical and economic barriers, are also ranked according to their importance and listed in section 4 of this report. Perceptional barriers are being dealt with by other consultants of the Roadmap 2010 and are not discussed in this report.

From the findings, conclusions are drawn and recommendations made (Section 4.0) to expedite the process of the main objectives of Roadmap 2010. The outcome of the study is condensed to an action plan, along with a recommendation to develop a much larger research proposal for submission under the 6th European Research Framework Programme. If executed, such a project would help to eliminate the barriers and limitations to the use of wood and wood-based products in construction.

Together with the woodworking industries and national authorities, the European Commission should act as a catalyst for change in the conditions affecting the use of wood by contributing to:

- raising the awareness of national authorities to the unnecessary differences between their various regulations,
- the encouragement of equality in the requirements underlying legislation and hence adopting better harmonised regulations.

Furthermore, the woodworking industry, supported by national and EU institutions, should inform the “value chain”, i.e. users, manufacturers etc.:

- about wood as a construction material,
- provide and distribute solutions to technical problems presently perceived to be associated with the use of wood in certain applications. Special attention should be given to facilitating the exchange and dissemination of information between different European countries. (In some countries wood-based products are used more extensively and information about the optimised use of wood is well established, this know-how must be communicated to countries with less experience).

Acknowledgements

The project group would like to thank CEI-Bois (The European Federation of Woodworking Industries) and its members, the EU working group “Enhanced Use of Wood” (EUW WG), which acted as steering committee and the Roadmap 2010 project without which this project would not have come to fruition. We would also like to thank all the organisations and interviewees, who have conscientiously participated in the survey. We have not listed the organisations and national correspondents that have taken part in this project due to confidentiality issues, but their participation, is very much appreciated.

Contents

1.0 Introduction

Wood and wood-based products have always been highly competitive building materials throughout the history of constructing buildings and remain competitive due to their ability to evolve in the form of new innovative products. In time traditional crafted joints have been replaced by bolted and bonded connections in large section wood structures and likewise, structural wood-based panels (sheathing) have superseded other bracing in wall panels. However, the global use of wood and wood-based products has often been curtailed by local availabilities.

The key requirement for the assured future of any construction material, including wood and wood-based products, is the ability to provide innovative building products, which can meet increasing client demands and expectations, especially for more environmentally friendly and sustainable forms of construction.

The construction market, unlike other consumer markets, changes only slowly. Whether this is a function of the value of construction products, a lack of knowledge and understanding [a range of other possible factors are listed in the Timber in Construction 2010 strategy (Ref. 1)] or simply a preference for tradition and well-established products is not wholly investigated. Very often the sectors driving changes, such as governments, can also unknowingly prevent the change of attitudes and the lift of barriers, making the construction market difficult to analyse. However, without this analysis and identification of barriers and subsequent implementation of solutions, changes in the construction industry can be excruciatingly sluggish. For clarification the following definitions have been used in the scope of this study

- a “barrier” prohibits the use of wood and wood-based products,
- a “limitation” allows the use of wood and wood-based products in an application but only if certain conditions have been satisfied.

Whilst wood and wood-based products are becoming globally available, the knowledge about building with wood and wood technology is not! Barriers to the enhanced use of wood and wood-based products in construction differ depending on the country. This is generally related to the level to which regulations have evolved in each country and in many cases also correlated to certain benchmark events, which have forced changes to those regulations to be implemented. Identifying major barriers from one country to another can help to increase understanding of limitations to the enhanced use of wood products and help establishing solutions and remedies.

This project identifies barriers to the use of wood in Europe and particular attention is given to barriers imposed by building regulations. This is done not only for generic wood frame building types, but also for innovative wood-based construction products that may form the future of the wood construction industry.

Once the main barriers in building regulations and other legislative documents have been identified, solutions have to be sought at European and National levels to eliminate the limiting factors to the enhanced use of timber.

2.0 Methodology

The Centre for Timber Technology & Construction (CTTC) of the Building Research Establishment (BRE) in collaboration with the Enhanced Use of Wood Working Group (EUW WG), acting as steering group to this project, designed a questionnaire (Appendix A) to identify European regulatory barriers and differences for the use of wood and wood-based products in building construction. The survey only considered residential type buildings, i.e.:

- Single family housing
- Multi-occupancy/ storey buildings

Answers were restricted to typical national building practices across Europe.

The questionnaire consisted of two major parts:

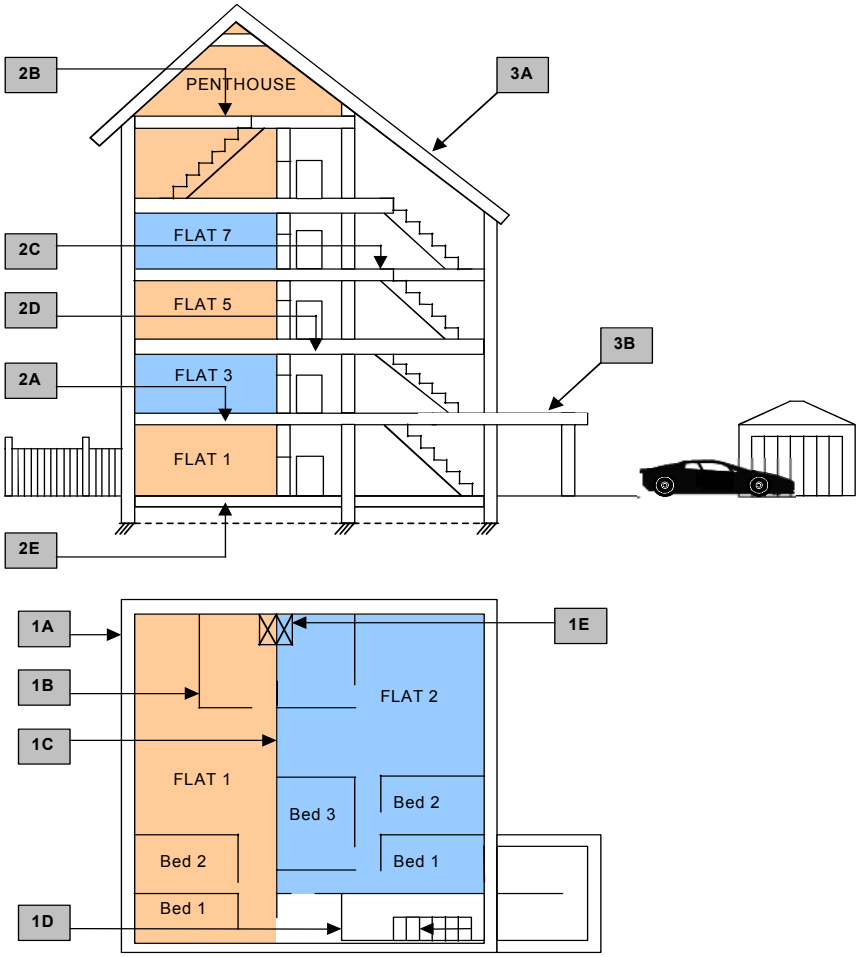
- **Part 1-** included questions for all the components and elements of a building under the main question of: ***"According to your national legislation, standards and building regulations may wood-based products be used in the following applications?"*** To help visualise the components and elements, an overall example of a multi-storey residential building was shown diagrammatically (Drawing 1) for reference. The structural elements were subdivided in numbered components/ zones (Drawing 2), for which the above general question needed to be answered. Three optional answers were offered:
  - Yes, with no limitations
  - Yes, with limitations (Please specify why)
  - No

  For the latter two options, the interviewee was asked to describe the limitations or exclusion in more detail, either in the form of quoting standards, national legislation, building regulation or simply by indicating which requirements were likely to be the limiting ones, such as, requirements for fire or durability. In some of the replies these limitations were not stated clearly. In such cases they were followed up with a telephone call, querying the relevant ambiguous areas.

- **Part 2**- included general questions amongst others about the external use of wood, the use of Eurocodes, and also included a limited study on other than regulatory barriers, such as technical, institutional and economic issues.

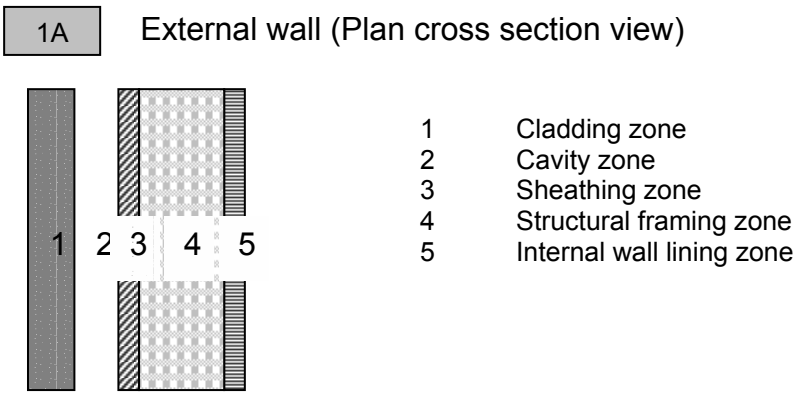
The questionnaire was sent to national correspondents of 24 countries, sectoral organisations as well as a network of professional experts and specialists. The interviewees were asked to provide their name and address at the beginning of the questionnaire to be treated on a confidential basis. All interviewees also provided their professional background, for which generic groups were provided for ticking at the start of the questionnaire. These groups were defined as:

- Clients
- Planners (e.g. Building authority)
- Designers (e.g. Architects, Engineers)
- Suppliers
- Construction/ Contractors
- National correspondents



Plan view of the ground floor layout

Drawing 1: Overall example of a multi-storey residential building for reference



Drawing 2: Generic external wall element, subdivided into zones

3.0 Summary of Findings and Discussion

This section summarises and discusses the pan–European findings of the study given in Appendix B.

3.1 The Survey

3.1.1 Experts / professionals

The national correspondents of each of the European member states, as listed in the CEI Bois database, were sent copies of the questionnaire. The national correspondents then distributed the questionnaire to appropriate and knowledgeable participants, ideally to one of each of the generic interviewee groups (listed in the Methodology section of this report). Nineteen out of twenty-four European countries replied (Table B-1 in Appendix B) and although the reply rate was above the average for surveys of this nature, the lack of adequate responses in some cases highlighted a few major issues such as:

- lack of experts in specific areas of the construction industry,
- interviewee's fear to expose a lack of knowledge through the given answers. This could be one of the reasons for some of the questionnaires not being sent back at all,
- the knowledge of requirements set out in building regulations was generally limited even among the experts/professionals. This is understandable as the building regulations cover a wide range of requirements and knowledge,
- in some countries, such as the Baltic states, changes in regulations were imminent and interviewees felt that a response based on the current regulations would be inadequate.

3.1.2 General comments

As the questionnaire was sent to participants who were familiar with the use of wood and wood-based products in buildings, it can be assumed that the favourable results of this survey, i.e. the number of replies stating "YES, WITH LIMITATIONS" rather than "NO" are likely to have been higher. If the questionnaire had been distributed throughout the construction industry, some of the "YES" and "YES with limitations" answers could have been changed/classed as "NO" because of negative perceptions regarding requirements. This also shows that there is an urgent need for distributing knowledge and information to construction professionals throughout the industry, especially to those who are not familiar with wood.

3.2 Walls (Figures 1 to 12, Appendix B)

Throughout Europe the main limitations for the use of wood-based products in external, party and internal walls are related to ensuring the adequate fire and sound performance of the wall building element, particularly in multi-storey/ occupancy dwellings. Generally, the use of wood-based products in wall elements is possible throughout Europe as shown in Figures 1, 3, 5, 7, 9 and 11 in Appendix B. In multi-storey dwellings the use of wood-based products in the cladding zone, as well as the external sheathing zone of

external walls, is non-compliant with building regulations in a couple of countries, including Switzerland and the UK. In the minority of countries the use of wood-based panels as internal linings was also prohibited. However, in some countries results were inconclusive and variable, ranging from “YES (no limitations)” to “NO” for identical questions.

In party walls and walls in escape routes, the regulatory limitations to the use of wood-based products were most pronounced. This refers specifically to the cavity zone in party wall construction and the wall lining zone in both party walls and walls in escape routes. In escape routes, wood-based products can only be used if adequate fire spread performance is ensured. These requirements generally address the safe design of multi-occupancy dwellings rather than single-family homes.

The requirements throughout Europe differ but all relate to compartmentation of fires and the restriction of fire spread, ensuring the safe use of means of escape routes. The performance requirements for structural walls and wall linings elements increase with increasing building height and are also related to the use of the building, especially with multiple occupancies (Ref. 2).

It was found that there is a considerable spread of answers within each country. The spread in answers is thought to be related to:

(i) regional differences within one country and/ or
(ii) misinformation or misunderstanding of the interviewee and
(iii) the number of replies received from one country.

Laundry and refuse chutes have been included in the survey with special interest in their use in multi-occupancy dwellings of greater than 4 storeys height. The results indicate that this type of full building height “shaft” is not commonly used throughout Europe. However, in most countries regulations would allow the use of wood-based products in this type of application. The most critical zone was believed to be the internal wall lining zone, where a range of countries limited the use of wood for fire safety reasons. The Netherlands also impose limitations due to hygiene reasons.

Overall, wood-based products were believed to be suitable for use in wall elements (Figures 3, 4, 6, 8, 10 and 12). In some countries, there were traditional uses of materials other than wood, which affected the perceived suitability of wood-based products for wall applications.

3.3 Floors (Figures 13 to 22)

The use of wood-based products in floors, ranging from compartment, internal and floors in escape routes and landings were surveyed in the questionnaire. Each floor element was further divided in five specific zones:

I. Flooring zone,
II. Acoustic zone,
III. Structural decking zone,
IV. Structural loadbearing zone,
V. Ceiling zone.

With the exception of the flooring zone in floors in escape routes, the use of wood-based products is generally possible throughout Europe if fire and sound insulation requirements are met (Figures 13, 15, 17, 19 and 21). In some European countries the use of any wood-based materials in escape routes (also for landings in escape routes) is

prohibited. This is primarily related to the fire requirements, particularly in multi-storey/ occupancy dwellings.

Overall, wood-based products were least popular in application in the acoustic and ceiling zones of floors. In internal and compartment floor constructions, limitations were generally related to providing adequate sound insulation, particularly in multi-occupancy dwelling applications. Wood-based products built in the acoustic zone (zone 2) was felt to be unsuitable and interviewees preferred other materials for use in this application, especially in combination with a lightweight structural floor system. However, in the majority of floor applications interviewees agreed that, they considered wood-based products to be suitable, despite limitations to their use.

Throughout Europe, suspended ground floors can be built with timber and wood-based products and are considered suitable for this application (Figures 21 and 22). In certain European countries, where traditionally, cellars are built, this form of ground floor construction was noted as alien but in principle possible.

3.4 Roofs (Figures 23 to 26)

In both habitable and non-habitable pitched roofs, timber elements and wood-based products are used throughout Europe (Figures 23 and 24). In most countries limitations to the use of timber relate to fire requirements. The regulatory limits are most influential in multi-storey dwellings, whilst in single-family housing timber products can be used in the roof constructions without any limitations.

Flat roofs are also built with timber throughout Europe but the water permeability of the wooden products and their durability impose limitations (Figures 25 and 26). The interpretation of regulations in Sweden, the Netherlands, Belgium and Germany seem to be ambiguous, as answers ranged from the use of wooden products without any limitations to the prohibition of wood-based products in flat roofs. Possible reasons for such widespread answers have already been discussed in more detail in Section 3.2 above.

3.5 Stairs (Figures 27 and 28)

Poland, Portugal and Germany prohibit the use of wood in the stair structure and in the Netherlands the back surface zone needs to be wood free. These requirements are related to fire requirements in escape routes in multi-occupancy dwellings. In single-family homes there are no limitations to the use of wood and wood-based products in stairs.

Whilst wood-based products are used in all stair components in the rest of Europe, the structure and back surface zone of the stairs needs to be, in most countries, designed according to fire regulations, especially for stairs in escape routes of multi-storey/ occupancy buildings. This is in accordance with the findings reported in Reference 2.

With exception of the back surface zone, wood-based products were considered suitable for applications in stairs by the interviewees.

3.6 Joinery and Outdoor structures (Figures 29 to 32)

Wood-based products are allowed and used in joinery and outdoor structures in all European countries. Joinery, such as doors and windows have to comply with fire regulations. Outdoor structures such as decking and walkways have to provide adequate durability. However, in some countries the use of wood products, for example in garages, is not common and can therefore affect the use of wooden products in such applications. Despite that fact, interviewees believed the use of wood-based products in these applications to be suitable throughout Europe (Figures 30 and 32).

3.7 External use of wood (Figure 33)

The external use of wooden based products in structure and cladding is mainly limited by the height of the building, whilst the use of timber products in windows is governed by the distance between adjacent buildings and the distance of the building to its boundary. These conditions are related to limiting the spread of fire between buildings.

3.8 Thermal and sound insulation requirements

The reply rate to these questions has been poor and the values provided proved to be very variable and often unreliable. This points to a general lack of in-depth knowledge in these areas but also indicates that such detailed requirements are not readily accessible to the profession and requires time consuming research in regulations. In some of the countries, from which replies have been obtained, sound and thermal insulation values were about to be changed and the current, actual values were deemed to be non-representative of the final requirements imposed to building walls and floors. The most unusual case was found in Switzerland where the sound insulation requirements were stated to be related to the usage of the room.

3.9 Wood treatments (Figure 34)

The survey indicated that at present the majority of the countries did not require any treatment when wood is used in ground floors, external walls, roofs, internal walls or soleplates.

Overall, the results for treatments were non-conclusive as the answers were widely spread even within each country. However, this is an area that the industry is currently trying to find a non-toxic preservative treatment which would be economically viable while not being detrimental to the life span/ performance of wood and wood-based product.

3.10 Guidance on wood structures (Figure 35)

It was the general belief that there was not enough guidance on wood structures. A couple of answers stated that the guidance for wood frame housing was sufficient but more general guidance on wood structures other than wood frame housing, would be needed. It was also felt that accessibility, availability of information and guidance are very crucial for increasing the use of wood.

3.11 Disproportionate collapse[♣] (Figure 36)

In most European countries buildings are designed against disproportionate [progressive] collapse. As in the thermal and sound insulation requirement questions before, there was a tendency for interviewees to leave this question blank and knowledge seemed to be lacking. This lack of in-depth knowledge was also shown by the fact that interviewees knew that there were regulations addressing disproportionate collapse but did not know the minimum number of storeys for which the regulation became mandatory. The number of storeys for which this special design case is applied in the different European countries is listed in table 1.

Country	Minimum number of storeys ? Did not know, - no answer, N/A not applicable
Austria	**?**
Belgium	**?**
Czech Republic	**1**
Denmark	**4**
Estonia	**?**
Finland	**N/A**
France	**?**
Germany	**4**
Greece	**-**
Hungary	**-**
Ireland	**-**
Italy	**?**
Latvia	**-**
Lithuania	**-**
Netherlands	**4**
Norway	**5**
Poland	**?**
Portugal	**N/A**
Slovak Republic	**-**
Slovenia	**-**
Spain	**?**
Sweden	**4**
Switzerland	**4**
UK	**5**

Table 1: Requirements for designing against disproportionate collapse

[♣] Disproportionate collapse describes the failure/ collapse of an entire building due to a minor cause. This type of damage is often also called progressive collapse as one minor damage in one part of the building affects the stability of the entire structure.

3.12 Wood from sustainably managed forests (Figures 37 and 38)

In the majority of European countries the use of certified wood (i.e. timber obtained from sustainable managed forests) for private or public clients is not common and not required by legislation at present. Only in the minority of cases, such as in Denmark, Netherlands and Poland, were the interviewees aware of policies, which require the use of legal, certified timber for private clients. Interviewees were aware of requirements/ purchase policies for timber from sustainably managed or at least from legal sources for public clients inter alia in Austria, Belgium, Denmark, Netherlands, Poland and the UK.

When asked how long it would take for legal, sustainably sourced timber to become mandatory for all building projects, the majority of interviewees felt this requirement was likely to become an issue in 5 to 10 or 10 to 20 years, with a considerable proportion of interviewees believing that the certification of timber will never become a requirement at all (Figure 38).

Generally the response rate for this question was low, maybe also indicating the general reluctance throughout Europe to such schemes. Several replies stated that this topic was currently undergoing vivid discussion in their countries (e.g. Denmark).

3.13 Eurocodes (Figures 39 and 40)

Most of the interviewees throughout Europe were familiar with Eurocodes. Whilst the majority was familiar with at least some of the Eurocodes, the use of Codes for designing buildings (all Eurocodes not only EC5) was not as common. In this survey about 60% of all replies were using Eurocodes in everyday design, opposed to 40% of replies, which did not. This supports the statement that Eurocodes gradually start replacing the national requirements, but at slow pace. Admittedly, more supporting CEN standards are being used than Eurocodes, as they have almost replaced or are replacing all the relevant national standards or the national standards are being updated with the CEN standards requirements by different countries.

3.14 Engineered wood products (Figure 41)

There are generally perceived to be no regulatory barriers to the use of engineered wood products throughout Europe. However, the costly and lengthy certification procedures required for these products were seen as barriers to the enhanced use of engineered wood products by the industry. Generally the fire resistance performance of the products was seen as problematic, which was also judged to be a barrier to their wider ranging application. The lack of codes and standards for these products forces the industry to take the route of technical approval (certification). The route of deemed-to-satisfy approval should be promoted and used until adequate codes and standards are available.

3.15 Other barriers (Figures 42 to 44)

The survey also examined other barriers to the enhanced use of wood. Four categories of barriers were established (Ref. 1) and listed in the questionnaire

a) Institutional
b) Technical
c) Economic
d) Perceptions

For each of these groups (except Perception - which has been addressed by Indufor, one of the other Roadmap 2010 consultants) several potential barriers were listed and interviewees were asked to rank these individual barriers by assigning them a number 1 to 7, 1 being the most important. Figures 42 to 44 plot the outcome of this survey for each of the categories listed above. Please note that the lower the bar chart on the graph the lesser the barrier to the use of wood and wood-based products.

Education, training and skills were seen to be of paramount importance to enhancing the use of wood and wood-based products. Also, though to a lesser extent, the safety, networking, industrial standards, planning, LCA (Life cycle assessment) and sustainability. Since the LCA and sustainability issues were ranked as one of the least important, it might be seen as a proof of resistance within the industry at present to accept the importance of LCA and sustainability. However, it has to be noted that government policies increasingly address and demand environmental, social and economical scorecards for products and building systems. This demands industry to be “active” rather than “reactive” in addressing and complying with these issues

In the **technical** barriers category the durability and the shortage of professionals and their knowledge were seen to be of greatest concern but also technical backup, lack of interaction with other materials, approvals, construction process and availability.

The most prominent **economic** barriers were seen to be the costing and pricing of wooden products, risks associated with the building process of wooden structures but also the investment by all sectors, insurance policies, lack of common methodology, supply chain and taxes.

4.0 Conclusion and Recommendations

4.1 Conclusions

4.1.1 General conclusions

- Overall, there are NO direct regulatory barriers to the use of wood and wood-based products in residential construction throughout Europe. However, there are many limitations which could act as barriers if not addressed in the future.
- Regulatory requirements are functional and may be considered equal for all materials. However, in practice the severity (nature, concept) of the requirements for wood might work as a barrier to free competition between materials if the requirements are set unrealistically high for wood and wood-based solutions. This may cause limitations to wood and wood-based products being used in certain applications for residential construction.
- The main regulatory limitations are perceived to be fire and acoustic performance, particularly in multi-storey/ occupancy dwellings.
- Regulatory authorities and others, including industry may not always be fully aware of the influences their regulations have on the use of different materials.
- Responses show that there are regional differences in building regulations (e.g. in Belgium: Walloon and Flemish part, others)
- There is also uncertainty and a lack of in-depth knowledge of building regulations relevant to the use of wood in construction.
- The differences between sets of regulations act as barriers to common practice across Europe. For instance technical solutions developed for one country cannot be utilised in another country. These differences also weaken the competitiveness of wood products. Due to these national variations in regulations, wood products cannot be produced in the most efficient way. Cooperation is needed to overcome these differences.
- Europe is becoming familiar with Eurocodes but their use in every day design is still very limited.
- Generally there is not enough guidance on wooden structures (design guidance for wood-frame housing was commented to be adequate, whilst non-housing design advice was very limited).
- Professionals rely on the available explanatory documents to guide them on regulatory issues. However, these documents do not always give a full understanding of the underlying general requirements. For example, if a regulation stipulates “Fire should not spread at a rate higher than x”, professionals’ perception could be that “Timber surfaces are prohibited because they spread fire”.
- Wood and wood-based products have not been the traditional material for some applications and this can affect the perception of their suitability.

4.1.2 Specific conclusions

- At present, in the majority of European countries wood from sustainably managed sources is not required when building for private clients. However, there is a tendency in some countries for public projects to specify such material [see section 3.12].
- Wood and wood-based products are used throughout Europe for joinery and outdoor structures without substantial regulatory limitations.
- External use of wood and wood-based products is mainly limited by the height of the building and the distance between adjacent buildings related to the requirements of external spread of fire.
- In the majority of European countries disproportionate [progressive] collapse is considered in design in relation to the number of storeys. In this context the maximum number of storeys permitted varies between countries.
- There are no regulatory barriers to the use of engineered wood products, such as LVL, Parallam, metal-web beams, I beams and Glulam. However, costly and time-consuming certification procedures for technical performance are seen as a barrier to the use of such products due to a general lack of codes and standards for these products.

4.1.3 Other barriers

- **Institutional**
  The institutional barriers are listed below in decreasing order of importance:
  - Education, training and skills
  - Safety
  - Networking within and between the woodworking and construction industries
  - Voluntary industrial standards
  - Planning
  - LCA (Life cycle assessment) issues
  - Sustainability issues

- **Technical**
  The technical barriers are listed below in decreasing order of importance:
  - Durability
  - Shortage of professionals and their knowledge
  - Technical back-up
  - Approvals
  - Lack of interaction with other materials
  - Construction process
  - Availability

- **Economic**
  The economic barriers are listed below in decreasing order of importance:
  - Costing and pricing
  - Risks
  - Investment by all sectors
  - Insurance policies
  - Lack of common methodology (e.g. in manufacturing)
  - Taxes

- Supply chain

- **Perception**
  The perceptional barriers are not covered by this project and are dealt with by other consultants of the Roadmap 2010 programme.

4.2 General Recommendations:

Eliminate the "limitations" to the enhanced use of wood and wood-based products!

- Define the clear objective for regulatory work. It is recommended here that the regulatory objective of the European woodworking industry for the year 2010 be that the competitiveness of wood in construction should be supported by harmonised standards and regulations in Europe:
  - to achieve this the key challenges are
    - to ensure the harmonisation process proceed well on EU level and that the competitiveness of wood be well considered in the process (i.e. safeguard that harmonisation does not adversely affect the use of timber);
    - the results of the harmonisation process are adopted.
    - national requirements be harmonised as much as it is reasonably possible;
    - that information and design tools be provided effectively to facilitate using the new codes;
    - provide information on how to adapt and modify wood and wood-based products to meet the requirements.
- The woodworking industry is relatively fragmented in comparison to competing industries. To enhance use of wood, the woodworking industry must co-ordinate its efforts and must collaborate and be more unified in order to achieve similar success to that of its wood competitors.
- Collaboration is needed on and between all sectors and levels, especially between industry, authorities, research institutes, construction experts and their networks. These networks are required nationally as well as at European level to maximise the interchange of experience and knowledge. This would create the critical mass and continuity to effectively influence regulatory development and improve the competitiveness of the sector.
- Taking into account the environmental, social and economic policy drivers, industry should be "active" in stimulating, influencing and generating policies rather than merely being "reactive" to policy drivers and imposed solutions.
- Industry should be receptive and responsive to the demand for wood from sustainably managed sources.
- Industry should identify financial, human and institutional resources to achieve the above objectives by implementing the action plan below.

4.3 Action Plan

1. Analyse the state-of-the-art of regulatory processes, including an evaluation of whether wood is considered to be on a level footing in comparison with other materials. Specifically, study Eurocodes in more detail to establish how easily wood is able to meet the design requirements. Communicate this information to industry.
2. Establish and nurture industry networks in conjunction with the European Commission and national authorities (see table 2) for:
    - Co-ordination of authorities and construction experts at national level,
    - Co-ordination of authorities and construction experts at European level,
    - Co-ordination of authorities and construction experts between both national and European levels,
    - Adopting harmonised regulations,
    - Co-ordination of R&D, such as fire, acoustics, environment, durability and so on.
3. As a precursor to this work (generating policies…) authorities and other relevant parties and target groups should be informed about the possibilities to enhance the use of wood. The different authorities at all levels should be invited to discuss the enhanced use of wood.
4. Provide relevant industrial and non-industrial codes and standards if not already available.
5. Promote a change in perceptions and attitudes of all relevant groups, through campaigns and proof of suitability of wood and wood-based products and their performance in defined applications.
6. Educate and train professionals and other groups.
7. Provide technical back-up, guidance documents, proofs and robust guidance on how wood structures and wood-based products can comply with functional requirements throughout Europe.
8. Create harmonised standards for engineered wood products. These standards need to be finalised and put to use quickly to ensure the smooth introduction of innovative wood products into the construction chain.
9. Promote and use the “deemed-to-satisfy” approach whenever in doubt (i.e. “technical approval” route), until adequate codes and standards are produced.
10. Provide information about how fire and sound insulation requirements can be met when using wood-based products.
11. Non-housing applications of wood and wood-based products need a lot of further research, guidance, back-up documents, etc.
12. Suggest and develop proposals for submission under the European Research Framework Programme to eliminate the barriers and limitations to the use of wood and wood-based products in construction. The participation should be across the wood and construction industries and together with other sectors (see also table 2).

The stakeholder groups responsible for these actions to be implemented have been listed in the “Action Plan” in table 2 on the following page.

	Competence, knowledge and training	R&D	Lobbying	Promotion
Industry, Research and Development bodies	***1, 2, 3, 6 and 7***	***5, 6, 7, 8, 9, 10, 11 and 12***	***5, 7, 8, 9, 10 and 11***	***5 and 7***
National and European associations	***1, 2, 3, 6 and 7***	***4, 6, 7, 8, 9, 10, 11 and 12***	***5, 7, 8, 9, 10 and 11***	***5 and 7***
National & Local EU authorities	***1 and 2***	***8, 9, and 11***	***8, 9 and 11***	

Table 2: Action plan

References

1. Enjily V, Bonfield P & Viljakainen M. - Timber in Construction 2010. BRE/Woodfocus 2001.

2. Östman B. & Rydholm D. National fire regulations in relation to the use of wood in European and some other countries. TRATEK Rapport P 0212044, Stockholm, December 2002, Sweden.

Appendix A - The template for the survey

Appendix B[1]– Summary of Pan-European results

Country	Reply
	✔ replied, X not replied
Austria	✔
Belgium	✔
Czech Republic	✔
Denmark	✔
Estonia	✔
Finland	✔
France	✔
Germany	✔
Greece	X
Hungary	X
Ireland	X
Italy	✔
Latvia	X
Lithuania	X
Netherlands	✔
Norway	✔
Poland	✔
Portugal	✔
Slovak Republic	X
Slovenia	✔
Spain	✔
Sweden	✔
Switzerland	✔
UK	✔

Table B-1: List of European countries surveyed and replies received

[1] Print out "Appendix B- Pan-European results" Figures 1 to 44