TOWARDS SUSTAINABLE ROOFING

Publication 271

‘TOWARDS SUSTAINABLE ROOFING’

REPORT OF THE

CIB W083 / RILEM 166-MRS JOINT COMMITTEE ON ROOFING MATERIALS AND SYSTEMS

ENVIRONMENTAL TASK GROUP

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1 ABSTRACT

An International Joint Committee of recognised experts and roofing specialists was established to gather information from different countries about the current criteria used for the design, construction and maintenance of membrane roofs that minimise harm to the environment. The issues are complex and involve inter-relationships that are not well understood at present.

The Joint Committee has developed in a single page document a summary of the key points of best practice. These common principles or ‘tenets of sustainable roofing’ are offered for the benefit of the building owner, designer, contractor and manufacturer seeking balanced guidance on environmental issues.

2 INTRODUCTION

The International Conference on Climate Change held during 1997 in Kyoto, challenged governments to improve on their national environmental performance in terms of reducing both pollution and energy demand. To work towards these desirable goals the concept of 'sustainable development' is being actively promoted in the construction and property industries in some countries.

There is a genuine interest among enlightened building owners and specifiers in adopting environmental objectives, as has been found from the numbers of enquiries arising from articles published in specifier magazines. This has been recognised by a few manufacturers who now promote their products' green attributes in marketing campaigns. In many countries a young generation has grown up in a culture sympathetic to 'green' issues and today many colleges and universities include environmental studies as part of their normal coursework.

The challenge facing the roofing industry is to translate this interest and goodwill into practical guidelines that will lead to improvements in the long-term performance of roofs, within a given financial budget. The purpose of this Report is to share the results of the work of the Task Group.

3 NATIONAL BACKGROUNDS

Throughout the life of the Committee brief verbal reports were received on how the concept of sustainable forms of construction was being developed in each of the contributors' countries. Many reports concluded that commercial constraints to minimise costs at all stages of the construction sequence remained of prime importance. Various speakers from different national backgrounds gave insights into roofing practice from their home country. Two examples are given to illustrate this diversity.

Lathika Jaisingh from the Central Building Research Institute in Roorkee in India gave a presentation on flat roofing practice in India. She described a number of typical roof constructions including the 'mud phuska roof'. This conventional form of roofing comprises of puddled clay, mixed with chopped straw and laid in several layers, using locally available materials and labour who have experience of the construction method. This traditional form of waterproofing flat roofs is a good example of a sustainable form of construction appropriate for India.

In contrast, Svend Svendson from the Technical University of Denmark, Department of Buildings and Energy, shared his experiences with the use of modern forms of membranes to form a 'self drying roof' in a Danish climate. Using a specially developed vapour control layer, entrapped water can dry out into the building over a period of time, improving the performance of the thermal insulation and extending the life of the materials. This technique builds in a fail-safe mechanism into the roof and is an example of a sustainable form of construction appropriate for Denmark.

4 DEFINITIONS OF SUSTAINABILITY

Constructing a definition of 'sustainability' that can transcend languages is difficult. In 1987 the Brundtland Report was presented to the United Nations Commission on the Environment and Development and it defined ***'sustainable development'*** as:

> *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs".*

Later in 1994, the First International Conference on Sustainable Construction was held in Florida, USA, where the attendees defined the term ***'sustainable construction'*** as:

> *"the creation and maintenance of a healthy built environment based on ecologically sound principles and resource efficiency".*

The Task Group has looked at the roofing element of a building and after considerable discussion it was thought that the following definition used in the introduction to a Workshop held at the Oak Ridge National Laboratory in the USA in October 1996, offered a good working definition of what is currently understood to be a ***'sustainable roof'*** :

> *"a roofing system that is designed, constructed, maintained, rehabilitated and demolished with an emphasis throughout its life cycle on using natural resources efficiently and preserving the global environment".*

These concepts are difficult, not only to implement but to comprehend. Their value lies in their far-reaching scope. Sustainable development supposes that construction methods and their relationship with the environment, life cycle analysis and environmental quality must all be taken into account. Consequently it is an all-encompassing concept that provides a stable framework for new design methods. Put simply, it is about taking a long-term approach.

Life cycle analysis involves an examination of each step in the life of matter: from raw material extraction or processing; production; packaging; transportation; design; installation; service life; reuse, recover or tear-off; and ultimately disposal.

At each stage of the model, various environmental attributes can be defined in terms of energy demand, CO_2 emission, types and quantities of pollutants, volume of waste, and other parameters. The final 'score' is related to the number of years' service that the roof gives, which will not be known at the design stage, but can be no more than a best estimate based on published data, assuming good standards of workmanship and maintenance. Another difficulty is in weighting the various environmental data. This raises questions such as: How important is it to reduce CO_2 emissions? What is the impact of transportation? What types of pollutants are hazardous and in what concentrations do they become harmful to health?

5 INTRODUCTION TO THE TENETS OF SUSTAINABLE ROOFING

Arising from discussions within the Task Group it was suggested that it would be helpful to draft a summary of what appears to be best practice for sustainable roofing, based on published reports, technical papers and the experience of the members. A similar approach was described in a paper written by Angioletti and al. published in the CSTB Journal, Issue 366 January- February 1996. It is considered important that this summary should be in a form that would be of practical everyday use for designers, suppliers and contractors alike, ideally on one page and widely circulated.

These basic principles, or 'tenets' of sustainable roofing, have been brought together by the Task Group. These tenets are applicable to membrane roofing systems on permanent buildings and have been broadly grouped under three key areas of improvement:

preservation of the environment.
conservation of energy.
extending the life of a roof.

The tenets are not fixed and irrevocable. It is expected that as our understanding develops of how roofs perform and how they affect the global environment, then the tenets would also evolve. It is important that the summary is kept short, to no more than one page, otherwise the busy designer will not use it.

Considered on their own, each tenet could be considered to be simplistic and no more than common sense. However, when they are considered as a whole it is thought that they make a contribution to promoting good practice in the design, construction and maintenance of membrane roofing systems.

The exercise is also beneficial in helping to focus future development on relevant issues. For example, in the UK there is a general lack of awareness of the fact that entrapped water affects the thermal performance of most common insulations. By highlighting this fact, attention can be given to improving site practice and maintenance, ultimately resulting in a reduction in the heat loss through the roof and long-term savings of energy.

6 TENETS OF SUSTAINABLE ROOFING October 2000

MINIMISE THE BURDEN ON THE ENVIRONMENT

1. Use products made from raw materials whose extraction is least damaging to the environment.

2. Adopt systems and working practices that minimise wastage.

3. Avoid products that result in hazardous waste.

4. Recognise regional climatic and geographical factors.

5. Where logical, use products that could be reused or recycled.

6. Promote the use of 'green roofs' supporting vegetation, especially on city centre roofs.

7. Consider roof designs that ease the sorting and salvage of materials at the end of the life of the roof.

CONSERVE ENERGY

8. Optimise the real thermal performance, recognising that thermal insulation can greatly reduce heating or cooling costs over the lifetime of a building.

9. Keep insulation dry, to maintain thermal performance and durability of the roof.

10. Use local labour, materials and services wherever practical to reduce transportation.

11. Recognise that embodied energy values are a useful measure for comparing alternative constructions.

12. Consider the roof surface colour and texture with regard to climate and the affect on energy and roof system performance.

EXTEND ROOF LIFESPAN

13. Employ designers, suppliers, contractors, tradespeople and facility managers who are adequately trained and have appropriate skills.

14. Adopt a responsible approach to design, recognising the value of the robust and durable roof.

15. Recognise the importance of a properly supported structure.

16. Provide effective drainage to avoid ponding.

17. Minimise the number of penetrations through the roof.

18. Ensure that high maintenance items are accessible for repair or replacement.

19. Monitor roofing works in progress and take corrective action as necessary.

20. Control access onto completed roofs to reduce puncture and other damage, providing defined walkways and temporary protection.

21. Adopt preventative maintenance, with periodic inspections and timely repairs.

NOTES
i. These tenets are applicable to membrane roofing systems on permanent buildings.
ii. As our understanding develops of how roofs perform and how they affect the global environment, then the tenets will also evolve.

7 JUSTIFICATIONS OF TENETS

For each of the tenets contributors undertook to write a short and succinct explanation as to why the tenet should be included.

MINIMISE THE BURDEN ON THE ENVIRONMENT

Tenet 1. Use products made from raw materials whose extraction is least damaging to the environment.

The construction of all roofs involves the cultivation and harvesting, or extraction of raw materials. The methods of resource procurement can negatively impact local, regional, and global ecosystems through landscape degradation, erosion, deforestation and reduced biodiversity of local and regional ecosystems. Products whose extraction or harvesting practices respect and protect the integrity of the ecosystems should be used, to the extent possible.

Reference:

1. Clark, C.W., *'Managing Planet Earth, Scientific American'*, Readings for Scientific American Magazine, W.H. Freeman & Co., New York: 1990.

Tenet 2. Adopt systems and working practices that minimise wastage.

For purposes of this report, wastage is defined as excess materials or refuse left behind after installation of the roofing system. Such materials are generally thrown away. It logically follows that this tenet be included because disposing of materials that had no use in the roof construction is a direct squandering of natural resources. Or said positively, the elimination of wastage conserves natural resources. Raw materials and energy used to produce waste materials are needlessly consumed as is the energy used in their transportation to the job site and to a disposal site. Moreover, if the waste ends up in a landfill, it unnecessarily adds refuse to the landfill.

Reference:

1. Angioletti, R; Gobin, C; Weckstein, M; and Durand, E; *'Twenty-four Criteria for designing and Constructing Buildings With a View to Sustainable Development,'* Cahiers du CSTB, CSTB Journal Studies and Research, Issue 336 (January-February 1996), p.20.

Tenet 3. Avoid products that result in hazardous waste.

This self explanatory tenet respects the long term well being of individuals who come into contact with roofing materials, during the life of the building and eventually when it is demolished and disposed of. Individual countries maintain registers defining what is considered to be 'hazardous'.

Reference:

1. *'Good Practice in the Selection of Construction Materials'*, Ove Arup & Partners, London, 1997.

Tenet 4. Recognise regional climatic and geographical factors.

What may be good environmental policy for one region is not necessarily beneficial for other regions. For example, in some low lying urban areas it is seen as good practice to provide for short-term rainwater storage on flat roofs, to attenuate sudden downpours and reduce the local risk of flooding. In contrast in other regions the free drainage of roofs is promoted to reduce overload on the structure and to extend the life of the waterproof membrane.

Other variable regional factors to be considered in roof design include the frequency of wind storms, the presence of airborne pollutants and the need in some urban areas to control heat emissions.

Tenet 5. Where logical use products that could be reused or recycled.

Recycled products have already had a life elsewhere; the environmental impact that their use has is limited to the resources needed to rejuvenate the old products into 'new' re-usable products. The use of recyclable products is environmentally attractive because their useful life expectancy can be greatly extended by numerous cycles of use and re-use.

Tenet 6. Promote the use of 'green roofs' supporting vegetation, especially on city centre roofs.

Green roofs can improve the local environment by reducing the amount of urban dust and increasing the local air humidity. The depth of soil does have some thermal resistance, and the total build-up can reduce noise transmission and provide acoustic insulation. Plants remove CO_2, improving air quality while providing a habitat for animals. There are also some negative environmental issues, such as the need for additional materials and energy for both the initial roof construction and for the long-term maintenance.

Reference:

1. Roberts, K., *'Sustainable Roofing 9: Green Roofs'*, RCI, London, July/Aug. 2000.

Tenet 7. Consider roof designs that ease the sorting and salvage of materials at the end of the life of the roof.

If material components of a roof can be sorted and salvaged, then their recycling or reuse is possible. In roofing systems with loosely laid or mechanically attached membranes most materials can be sorted when the roofing is removed. In conventionally insulated systems (membrane on top of insulation) the use of protection boards between the roofing membrane and insulation can preserve the integrity of insulation thereby allowing its reuse.

Tenet 8. Optimise the real thermal performance, recognising that thermal insulation can greatly reduce heating or cooling costs over the lifetime of a building.

During the lifetime of a building, large quantities of fuel are used for heating and or cooling. A significant proportion is lost through the roof and it makes sense to reduce this wherever possible. Practical measures include specifying adequate thicknesses of insulation, minimising thermal bridging and reducing air leakage.

Reference:

1. BRE Report, *'Thermal Insulation: Avoiding Risks'*, BRE, London, 1994

Tenet 9. Keep insulation dry, to maintain thermal performance and durability of the roof.

The thermal and mechanical properties of most types of insulation deteriorate when they become wet for long periods of time. It is important that from the delivery and storage on site, to the installation and through the life of the roof, practical efforts are made to keep the insulation dry.

Reference:

1. Tobiasson, W., and Ricard, J., *'Moisture gain and its thermal consequence for common roof insulations'*, Proceedings of 5th Conference on Roofing Technology, NRCA, 1979.

Tenet 10. Use local labour, materials and services wherever practical to reduce transportation.

Transportation of goods is a major factor in the environmental cost of building materials. The packaging of material and the use of fuel for lengthy transportation have an effect on the environment. Use of local labour not only reduces transportation costs and maintains local employment, but also helps ensure continuity of knowledge and expertise that takes into account the local or micro environment.

Tenet 11. Recognise that embodied energy values are a useful measure for comparing alternative constructions.

Improved environmental performance requires a reduction in the energy consumed in the production of a product or a construction. Calculating the embodied energy of a product allows for comparing the energy intensity of alternative products and systems.

Such calculations may need to be a weighted to reflect the advantages or disadvantages of using renewable or non renewable energy, relative toxicities and the transportation element.

It is important to identify the period of analysis, such as the entire life cycle or a specific phase in the production process. Accurate and reliable information for some materials may be difficult to obtain.

Reference:

1. *'Measuring Eco-efficiency in Business'*, National Round Table on the Environment and the Economy, Canada, 1997.

Tenet 12. Consider the roof surface colour and texture with regard to climate and the affect on energy and roof system performance.

The affect of solar heat gain on building interiors is generally greater from flat surfaces, such as roofs, compared to vertical surfaces. On roof surfaces with a high radiation absorbance, temperature differences between the roof surface and the building interior can be large. Under these conditions, considerable heat flow into the building may occur, particularly if the roof system is inadequately insulated. This results in greater energy consumption and costs. The roof surfacing, colour and texture on energy performance for a given location should be considered.

Reference:

1. Strother, E.F and Turner, W.C., *'Thermal Insulation Building Guide'*, Robert E. Krieger Publishing Co., Malabar: 1990.
2. EnergyStar Program.

EXTEND ROOF LIFESPAN

Tenet 13. Employ designers, suppliers, contractors, tradespeople and facility managers who are adequately trained and have appropriate skills.

The creation and continuous improvement of sustainability characteristics for roofing systems depends on the development and documentation programs of suppliers, designers and contractors who understand and expand upon the philosophy and concepts.

The harvest of beneficial sustainability characteristics for roofing systems depends on the appreciation and understanding of those characteristics by designers, contractors and suppliers who make the complex assessments and final installation selections.

Benefits not recognized will not be fully utilized. Without the appropriate knowledge and skills to deal with the analysis, the benefits will be lost. National Codes of Practice and supporting training programs help to improve the quality of completed work and extend the life of the roof.

References:

1. NRCA Training Programs.

Tenet 14. Adopt a responsible approach to design, recognising the value of the robust and durable roof.

A significant contributory factor to the premature failure and under-performance of roofs is inadequate design. In some countries there is no individual 'roof designer' and thus responsibilities can become divided and the design co-ordination poor. Providing resources and time for the design of a roof can improve its quality and lifespan.

The robust roof is one that has proved itself to be stable and reliable. It is a roof that is relatively insensitive to errors of design, manufacture, assembly or use, and thus provides a greater probability of lasting for its intended design life.

References:

1. Groàk, S, *'The Idea of Building'*, E & FN Spon, London, 1992
2. Roberts, K, *'Working Towards Getting the Roof Right First Time'*, IWA Proceedings, Amsterdam, April 1995.
3. Roodvoets, DL, *'The Robust Roof'*, ASHRAE Proceedings, April 1995.

Tenet 15. Recognise the importance of a properly supported structure.

The structure beneath a roof has a direct impact on all aspects of performance. The effects of self-weight and imposed loads require consideration at initial design and throughout a roof's life. The deterioration of the structure due to environmental loading can result in changes in the capability to resist the loading and may lead to loss of water-tightness, diminished thermal protection, reduced fire resistance or premature structural failure. A supporting structure that properly addresses the loading and deterioration concerns will assist in reducing energy consumption, provide an extended service life and minimise wastage.

Reference:

1. Dupuis, R, *'Structural safety issues in roofing'*, Proceedings of the Low-Slope Reroofing Workshop, Oak Ridge, Tennessee, May 1994.

Tenet 16. Provide effective drainage to avoid ponding.

Ponded water retained indefinitely on a roofing system generally accelerates ageing and multiplies the collateral impact due to incidental deterioration or damage. Maintenance, which is an integral element of system sustainability, is made more difficult or impossible with a situation that inhibits preventive or remedial activities.

Where temporary stormwater retention is intended or required, the operational strategy should include provision for regular periods of drained status as a baseline condition or at least a prescribed operational choice.

Reference:

1. Roberts, K., *'Sustainable Roofing 4: Provide positive drainage to reduce long term ponding'*, RCI, London, May 1998

Tenet 17. Minimise the number of penetrations through the roof.

Regardless of roof type, all penetrations interrupt the monolithic nature of the roof membrane. These interruptions require a second or third level of attention to achieve a watertight state. Penetrations increase the need for a high level of maintenance. Historically, water penetration is first manifested at penetrations. When necessary, all penetrations should be thoroughly and properly detailed and co-ordinated with the various trades. Minimising the number of roof penetrations and careful attention to detail is essential to successful long-term roof performance.

References:

1. NRCA Roofing and Waterproofing Manual.
2. SMACNA: Guidelines for Roof Mounted Outdoor Air Conditioner Installation Manual.

Tenet 18. Ensure that high maintenance items are accessible for repair or replacement.

Timely and effective maintenance of roofs will maximise their useful service lives thereby delaying their demolition, disposal and replacement. Roof assembly components have dissimilar service lives and maintenance requirements based on their particular physical properties and conditions and exposure. Ensuring that those components requiring frequent preparation or replacement are easily accessible will facilitate their maintenance, minimise disturbance to other parts, and maximise the useful service life of the roof.

References:

1. Baxter, R., *Roof Construction Details*, Proceedings of 6th Conference on Roofing Technology, NRCA, 1981.
2. Becker, R., *Ensuring Building Serviceability at The Design Stage.* Proceedings of Durability of Building Materials and Components 8, Institute For Research in Construction, National Research Council Canada, Ottawa, 1999.
3. Canadian Roofing Contractors' Association, *Roof Top Equipment,* Technical Bulletin, Volume 44, CRCA, October 1995.
4. Crowther, P., *Designing For Disassembly To Extend Service Life and Increase Sustainability.* Proceedings of Durability of Building Materials and Components 8, Institute for Research in Construction, National Research Council, Canada, Ottawa, 1999.

Tenet 19. Monitor roofing works in progress and take corrective action as necessary.

When multi-layer roofing works are in progress there is usually the need to inspect and check the adequacy of the layer being covered up. These tasks should be carried by experienced and knowledgeable people, with corrective action taken in a timely way to

minimise reworking and the wastage of materials. These basic quality control steps help to improve the quality of the finished roof and thus give it a longer lifespan.

Tenet 20. Control access onto completed roofs to reduce puncture and other damage, providing defined walkways and temporary protection.

Puncture damage of roofing membranes is caused by foot and wheeled traffic, the use of the roof as an unprotected working platform, local heat sources such as hot sparks from adjacent cutting operations, and from natural causes. By controlling access and keeping people off the roof there will be less puncture damage and the roof will last longer.

Reference:

1. Roberts, K, *'Sustainable Roofing 5: Control access onto completed roofs to reduce puncture damage'*, RCI, London, June/July 1998.

Tenet 21. Adopt preventative maintenance, with periodic inspections and timely repairs.

If there is no maintenance over a period of years then relatively minor issues, such as a small hole or a short length of loose perimeter trim, can progressively deteriorate and ultimately result in either leakage into the building or premature storm damage. The old saying of 'a stitch in time saves nine' is true.

8 CONCLUSIONS

This Report has brought together the findings from the national enquiries and proposes a set of key points of best practice. These common principles or 'tenets of sustainable roofing' have been translated into ten different languages and are offered for widespread use. They take the form of practical advice that will minimise the burden on the environment, conserve energy and ultimately extend the lifespan of the roof.

The challenge that is presented to the roofing industries is to adopt these tenets. They can offer long-term commercial advantages. Publicity and education are seen as key to the implementation of more sustainable forms of roof construction.

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APPENDIX B. TRANSLATIONS OF TENETS OF SUSTAINABLE ROOFING

The Abstract and the one page set of 'Tenets of Sustainable Roofing' have been translated into the following languages, in the hope that the concepts will be more widely circulated, discussed and implemented.

1 English
2 French
3 Portuguese
4 Spanish
5 Italian
6 German

B1. Version: English

'TOWARDS SUSTAINABLE ROOFING'

ABSTRACT OF REPORT FROM THE CIB W.83 / RILEM 166-RMS JOINT COMMITTEE ON ROOFING MATERIALS AND SYSTEMS

Keywords: sustainable roofing, membrane roofing, waterproofing, sustainability.

Abstract: An International Joint Committee was established to gather information from different countries about the current criteria used for the design, construction and maintenance of membrane roofs that minimise harm to the environment. The issues are complex and involve inter-relationships that are not well understood at present. The Joint Committee has developed in a single page document a summary of the key points of best practice. These common principles or 'tenets of sustainable roofing' are offered for the benefit of the building owner, designer, contractor and manufacturer seeking balanced guidance on environmental issues.

The Committee: The CIB W.83 / RILEM 166-RMS Joint Committee on Roofing Materials and Systems is a voluntary and independent group of recognised experts and roofing specialists from almost 20 countries who have met annually between May 1996 and October 2000. CIB is the International Council for Building Research Studies and Documentation. RILEM is the International Union of Testing and Research Laboratories for Materials and Structures.

Main Contact: The Report is available in english from :
The Secretary,
CIB / RILEM Joint Committee on Roofing Materials and Systems,

TENETS OF SUSTAINABLE ROOFING **October 2000**

MINIMISE THE BURDEN ON THE ENVIRONMENT

1. Use products made from raw materials whose extraction is least damaging to the environment.

2. Adopt systems and working practices that minimise wastage.

3. Avoid products that result in hazardous waste.

4. Recognise regional climatic and geographical factors.

5. Where logical, use products that could be reused or recycled.

6. Promote the use of 'green roofs' supporting vegetation, especially on city centre roofs.

7. Consider roof designs that ease the sorting and salvage of materials at the end of the life of the roof.

CONSERVE ENERGY

8. Optimise the real thermal performance, recognising that thermal insulation can greatly reduce heating or cooling costs over the lifetime of a building.

9. Keep insulation dry, to maintain thermal performance and durability of the roof.

10. Use local labour, materials and services wherever practical to reduce transportation.

11. Recognise that embodied energy values are a useful measure for comparing alternative constructions.

12. Consider the roof surface colour and texture with regard to climate and the affect on energy and roof system performance.

EXTEND ROOF LIFESPAN

13. Employ designers, suppliers, contractors, tradespeople and facility managers who are adequately trained and have appropriate skills.

14. Adopt a responsible approach to design, recognising the value of the robust and durable roof.

15. Recognise the importance of a properly supported structure.

16. Provide effective drainage to avoid ponding.

17. Minimise the number of penetrations through the roof.

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19. Monitor roofing works in progress and take corrective action as necessary.

20. Control access onto completed roofs to reduce puncture and other damage, providing defined walkways and temporary protection.

21. Adopt preventative maintenance, with periodic inspections and timely repairs.

NOTES
i. These tenets are applicable to membrane roofing systems on permanent buildings.
ii. As our understanding develops of how roofs perform and how they affect the global environment, then the tenets will also evolve.

B2. Version : Française

« OBJECTIF : DES TOITS PLUS DURABLES »

RÉSUMÉ DU RAPPORT DU COMITÉ MIXTE CIB W.83 / RILEM 166-MRS SUR LES SYSTÈMES DE TOITURE

Mots-clés : membrane de couverture, étanchéité, environnement, durabilité

Résumé : Un groupe de travail international a été mis sur pied avec mission de recueillir de l'information auprès de différents pays concernant les critères utilisés actuellement pour la conception et la construction de systèmes de toiture qui soient le moins nocifs possible pour l'environnement. Il s'agit de questions complexes qui mettent en jeu des relations mutuelles qui ne sont pas bien comprises, à l'heure actuelle.
Les propriétaires de bâtiments, les concepteurs et les entrepreneurs souhaitent obtenir des conseils complémentaires au sujet des questions environnementales. Le groupe en question a proposé dans un document d'une page une série de points clés indiquant les règles à suivre en matière de toits. Ces principes communs, qui visent notamment à assurer la durabilité des toits, sont présentés au profit du grand nombre.

Le comité : Le Comité mixte CIB W.83 / RILEM 166-MRS sur les matériaux et systèmes de couverture est un groupe bénévole et indépendant d'experts et de spécialistes des toits reconnus provenant d'une vingtaine de pays; ils s'est réuni chaque année entre mai 1996 et octobre 2000. La RILEM est la Réunion internationale des laboratoires d'essais et de recherches sur les matériaux et les constructions. Le CIB est l'International Council for Building Research Studies and Documentation.

Autres précisions : On peut se procurer le texte intégral du rapport (en anglais) en s'adressant à :

Le secrétaire
Comité mixte CIB / RILEM sur les matériaux et systèmes de couverture

PRINCIPES À RESPECTER DANS LE DOMAINE DES TOITS **Octobre 2000**

RÉDUIRE LE PLUS POSSIBLE L'IMPACT NÉGATIF SUR L'ENVIRONNEMENT

1. Utiliser des produits faits de matières brutes dont l'extraction cause le moins de dommage à l'environnement.
2. Adopter des systèmes et des façons de travailler qui réduisent le plus possible le gaspillage.
3. Éviter les produits qui provoquent la formation de déchets dangereux.
4. Tenir compte des facteurs climatiques et géographiques régionaux.
5. Lorsque cela est logique, utiliser des produits qui peuvent être réutilisés ou recyclés.
6. Promouvoir la mise en oeuvre de « toits verts » végétalisés, en particulier dans les centres-villes.
7. Privilégier un type de toit qui facilite le tri et la récupération des matériaux à la fin de la période de service du toit.

ÉCONOMISER L'ÉNERGIE

8. Optimiser la performance thermique réelle, compte tenu du fait que l'isolation thermique peut réduire considérablement les coûts de chauffage ou de rafraîchissement pendant la vie utile d'un bâtiment.
9. Garder l'isolant au sec afin d'assurer la performance thermique et la durabilité du toit.
10. Utiliser de la main-d'œuvre, des matériaux et des services locaux, là où cela est pratique, pour réduire le transport.
11. Reconnaître que les valeurs énergétiques incorporées constituent un moyen utile de comparer les autres types de construction.
12. Considérer la couleur et la texture de la surface du toit en fonction du climat, ainsi que leur effet sur la performance énergétique et sur le toit.

ACCROÎTRE LA DURÉE DE VIE DES TOITS

13. Employer des concepteurs, des fournisseurs, des entrepreneurs et des gens de métier qui sont bien formés et possèdent les bonnes qualifications.
14. Adopter une démarche responsable face à la conception en reconnaissant la valeur d'un toit robuste et durable.
15. Reconnaître l'importance d'une bonne structure porteuse.
16. Assurer l'évacuation des eaux afin d'éviter la formation de flaques d'eau.
17. Réduire le plus possible le nombre de pénétrations au travers du toit.
18. Veiller à ce que les éléments exigeant beaucoup d'entretien soient accessibles aux fins de réparation ou de remplacement.
19. Surveiller le déroulement des travaux de couverture et prendre des mesures rectificatives.
20. Contrôler l'accès aux couvertures, après leur réalisation, afin de réduire la perforation et les autres dommages, en prévoyant des lieux de passage définis et une protection temporaire.
21. Assurer un entretien préventif grâce à des inspections périodiques et à des réparations opportunes.

NOTES:

i. Ces principes s'appliquent aux revêtements d'étanchéité installés sur les bâtiments permanents.
ii. Ils évolueront à mesure que nous comprendrons mieux comment les toits se comportent et influent sur l'environnement global.

B3. Versão: Português

"EM BUSCA DE UMA COBERTURA SUSTENTÁVEL" RESUMO DO RELATÓRIO DO CIB W.83 / RILEM 166 - MRS – COMITÊ CONJUNTO SOBRE IMPERMEABILIZAÇÃO COM MANTAS E MEMBRANAS

Palavras Chave: Impermeabilização com mantas e membranas, impermeabilização, meio ambiente, sustentabilidade.

Resumo: Um grupo-tarefa internacional foi criado para reunir informações de diferentes países sobre os critérios atualmente adotados para especificação e execução de sistemas de impermeabilização de coberturas que minimizem o impacto ao meio ambiente. Os temas são complexos e envolvem interfaces ainda não muito claras no momento. O proprietário da edificação, o projetista e o empreiteiro estão buscando orientações equilibradas nos assuntos ambientais. O grupo propôs, num documento de uma pagina, um conjunto de pontos chave considerados mais importantes. Estes princípios comuns, ou "Princípios para coberturas sustentáveis", estão disponíveis para o uso mais amplo possível.

O Comitê: O comitê conjunto de materiais e sistemas CIB W.83 e RILEM MRS-166, de impermeabilização é um grupo voluntário e independente, com experts e especialistas reconhecidos de mais de 20 países, que se reuniram anualmente, entre Maio de 1996 e Outubro de 2000. O RILEM, é a União Internacional de Laboratórios de Pesquisas de Materiais e Estruturas. CIB é o Conselho Internacional para Estudos, Documentação e Pesquisa das Edificações.

Maiores Detalhes: Uma cópia completa do relatório está disponível, em Inglês no seguinte local:

Secretaria
CIB / RILEM Comitê Conjunto de Materiais e Sistemas de Impermeabilização.

PRINCÍPIOS DE UMA COBERTURA SUSTENTÁVEL **Outubro/2000**

MINIMIZAR OS DANOS AO MEIO AMBIENTE

1 - Use produtos em que a extração da matéria prima cause o mínimo de danos ao meio ambiente.

2 - Adote sistemas e procedimentos executivos que minimizem dejeitos.

3 - Evite produtos que se transformem em dejeitos perigosos.

4 - Leve em consideração os fatores geográficos e climáticos.

5 - Onde for viável, use produtos que possam ser reutilizados ou reciclados.

6 - Estimule o uso de coberturas verdes, com cobertura vegetal, especialmente em coberturas nos centros de cidades.

7 - Considere projetos que facilitem a seleção e recuperação de materiais, no fim da vida útil da cobertura.

CONSERVAR ENERGIA

8 - Otimize a performance térmica, levando em conta que a isolação térmica reduz muito os custos de aquecer/resfriar, ao longo da vida da cobertura.

9 - Mantenha a isolação seca, para manter a performance e durabilidade do sistema.

10 - Use mão de obra, materiais e serviços locais, sempre que possível, para reduzir transportes.

11 - Tenha em mente que os valores de energia incorporada são medidas úteis para comparar soluções alternativas.

12 - Leve em conta a cor e a textura da superfícies, em função do clima, e o efeito na energia e na performance do sistema da cobertura.

AUMENTAR A VIDA ÚTIL DO SISTEMA

13 - Contrate projetistas, fornecedores, aplicadores e profissionais da área, que tenham bom treinamento e as habilidades necessárias.

14 - Adote uma postura responsável no projeto, reconhecendo a importância de uma cobertura robusta a durável.

15 - Reconheça a importância de uma estrutura de sustentação adequada.

16 - Planeje uma drenagem eficiente para evitar empoçamentos.

17 - Minimize o número de elementos passantes na estrutura.

18 - Certifique-se que itens sujeitos a manutenção frequente, estejam facilmente acessíveis para reparos ou substituição.

19 - Monitorara aplicação durante a obra, e adotar as adote as medidas corretivas necessárias.

20 - Controle o acesso sobre as coberturas já prontas, para reduzir perfuração e outros danos; crie passarelas definitivas, e proteções temporárias.

21 - Adotar manutenções preventivas, com inspeções periódicas e reparos no tempo devido.

NOTAS:

i. Estes princípios são aplicáveis a coberturas de prédios permanentes, com coberturas impermeabilizadas.

ii. Com o progresso de nossa compressão sobre a performance das coberturas, e como elas afetam o meio ambiente no mundo, estes princípios também irão evoluir.

B4 Versión: Español

'TRABAJANDO POR UN TECHADO SUSTENTABLE'

RESUMEN DEL INFORME DEL COMITÉ CONJUNTO CIB W.83 / RILEM 166-MRS SOBRE SISTEMAS DE TECHADO CON MEMBRANA

Términos clave: techado con membrana, impermeabilización, medio ambiente, sustentabilidad.

Resumen: Se constituyó un equipo internacional de trabajo para reunir información de diferentes países acerca de los criterios empleados actualmente para diseñar y construir techos con membrana que reduzcan al mínimo los daños al medio ambiente. Se trata de cuestiones complejas, que implican interrelaciones no muy bien comprendidas hasta la fecha.
El propietario, el proyectista y el contratista requieren una orientación equilibrada sobre cuestiones ambientales. El grupo ha propuesto en un documento de una sola página una serie de puntos de buena práctica. Esos principios comunes o 'normas de techado sustentable' se ofrecen para su difusión como empleo generalizado.

El Comité: El Comité conjunto CIB W.83 / RILEM 166-MRS sobre materiales y sistemas de techado es un grupo voluntario e independiente de reconocidos expertos y especialistas en techado de casi 20 países, que se han reunido anualmente entre mayo de 1996 y octubre de 2000. RILEM es la Unión Internacional de Laboratorios de Ensayo e Investigación de Materiales y Estructuras. CIB es el Consejo Internacional de Estudios y Documentación para la Investigación en Construcción.

Detalles adicionales: Se puede obtener un ejemplar completo del informe original en inglés solicitándolo a:

The Secretary,
CIB / RILEM Joint Committee on Roofing Materials and Systems

NORMAS DE TECHADO SUSTENTABLE **Octubre de 2000**

REDUCIR AL MÍNIMO LA CARGA SOBRE EL MEDIO AMBIENTE

1. Usar productos elaborados con las materias primas cuya extracción sea menos perjudicial para el medio ambiente.
2. Adoptar sistemas y métodos de trabajo que reduzcan al mínimo el desperdicio.
3. Evitar los productos que generan residuos peligrosos.
4. Reconocer los factores climáticos y geográficos regionales.
5. Cuando sea lógico, usar productos que puedan reutilizarse o reciclarse.
6. Promover el empleo de 'techos verdes' que admitan vegetación, especialmente en los centros urbanos.
7. Estudiar diseños de techos que faciliten la selección y recuperación de los materiales al final de la vida útil del techo.

CONSERVAR LA ENERGÍA

8. Optimizar el rendimiento térmico real, reconociendo que la aislación térmica puede reducir considerablemente los gastos de calefacción o refrigeración a lo largo de la vida útil de un edificio.
9. Mantener seca la aislación para conservar el rendimiento térmico y la durabilidad del techo.
10. Emplear mano de obra, materiales y servicios locales siempre que sea práctico para reducir el transporte.
11. Reconocer que los valores de energía incorporados son una medida útil para comparar construcciones alternativas.
12. Tener en cuenta el color y la textura de la superficie del techo en relación con el clima y su efecto sobre el rendimiento energético y del sistema del techo.

PROLONGAR LA VIDA DEL TECHO

13. Recurrir a proyectistas, proveedores, contratistas y comerciantes suficientemente instruidos y que posean la competencia apropiada.
14. Adoptar un enfoque responsable en cuanto al diseño, admitiendo el valor de un techo sólido y durable.
15. Reconocer la importancia de una estructura de apoyo correcta.
16. Proporcionar un drenaje eficaz para evitar el estacamiento de agua
17. Reducir al mínimo la cantidad de perforaciones a través del techo.
18. Asegurarse de que los elementos de mantenimiento elevados sean accesibles para repararlos o cambiarlos.
19. Supervisar las obras de techado mientras se ejecutan y adoptar las medidas correctivas que sean necesarias.
20. Controlar el acceso a los techos terminados para reducir las perforaciones y otros daños, previendo pasajes definidos y protección transitoria.
21. Adoptar un mantenimiento preventivo, con inspecciones periódicas y reparaciones oportunas.

NOTAS

i. Estas normas son aplicables a los sistemas de techado con membrana en edificios permanentes.
ii. A medida que aumenten nuestros conocimientos sobre el comportamiento de los techos y la manera en que afecten el medio ambiente mundial, las normas también evolucionarán.

B5 Versione: Italiana

OBIETTIVO : COPERTURE SOSTENIBILI

RIASSUNTO DAL RAPPORTO DEL COMITATO CONGIUNTO CIB W 83 E RILEM 166-MRS SUI SISTEMI DI COPERTURA

Parole chiave : membrane per coperture, impermeabilizzazione, ambiente, sostenibilità

Riassunto E' stato costituito un Gruppo di Lavoro internazionale con lo scopo di raccogliere informazioni dai vari paesi concernenti i criteri correnti nella progettazione e costruzione di coperture impermeabilizzate che riducano ai minimi valori l'impatto negativo verso l'ambiente.
Si tratta di problemi complessi che implicano interazioni al momento attuale non ancora ben note e conosciute.
I proprietari degli immobili, i progettisti ed i costruttori necessitano di linee guida per ciò che riguarda l'impatto ambientale. Il gruppo di lavoro propone in un documento conciso di una sola pagina una serie di punti chiave per una buona regola da seguire nella realizzazione delle coperture.
Questi principi comuni riguardanti le coperture sostenibili, che peraltro si preoccupano della durabilità dell'opera, vengono presentati come esempio generale per un uso il più ampio possibile.

Il Comitato Il Comitato Congiunto CIB W 83 e RILEM 166-MRS sui Materiali e Sistemi di Impermeabilizzazione è un gruppo volontario ed indipendente costituito da noti esperti e specialisti di coperture impermeabilizzate di oltre 20 paesi che si sono riuniti una volta l'anno tra maggio 1986 e ottobre 2000 .
RILEM è l'acronimo di Unione Internazionale dei Laboratori di Ricerca e Prova sui Materiali e Strutture (**R**eunion **I**nternationale des **L**aboratoires d'**E**ssais et des recherches sur les **M**ateriaux et les constructiones).
CIB è l'acronimo di Consiglio Internazionale per la Ricerca, Studio e Documentazione nelle Costruzioni (**I**nternational **C**ouncil for **B**uilding research, studies and documentation).

Ulteriori informazioni

Una copia integrale del Rapporto conclusivo in inglese è ottenibile presentando richiesta a :
Il Segretario
CIB - RILEM Joint Committee on Roofing Materials and Systems

PRINCIPI DA RISPETTARE DELLE COPERTURE IMPERMEABILIZZATE SOSTENIBILI

RIDURRE IL PIU' POSSIBILE L'IMPATTO NEGATIVO SULL'AMBIENTE

1- Usare materiali ottenuti da materie prime la cui estrazione causi i minori danni possibili all'ambiente
2- Utilizzare sistemi di costruzione e metodi di lavoro che riducano al minimo i rifiuti
3- Evitare materiali che producano rifiuti pericolosi
4- Prestare la massima attenzione ai fattori climatici e geografici regionali
5- Quando possibile e logico, utilizzare materiali riusabili o riciclabili
6- Promuovere l'uso di "tetti verdi" che permettano la vegetazione, specialmente nei centri urbani
7- Privilegiare sistemi che facilitino il recupero e la selezione dei materiali alla fine della vita utile della copertura

ECONOMIZZARE L'ENERGIA

8- Ottimizzare le prestazioni termiche reali, riconoscendo che l'isolamento termico può ridurre in modo considerevole i costi di riscaldamento o raffrescamento per tutta la vita utile della costruzione
9- Mantenere l'isolamento asciutto e secco al fine di garantire le prestazioni termiche e la durabilità della copertura
10- Utilizzare mano d'opera, materiali e servizi locali ove possibile allo scopo di ridurre i trasporti
11- Ammettere che i valori di energia incorporata costituiscono un mezzo utile di paragone tra tipi alternativi di costruzione
12- Tener in conto il colore e la tessitura della superficie del tetto in funzione del clima oltre ai loro effetti sulle prestazioni energetiche e sul sistema copertura

PROLUNGARE LA VITA UTILE DELLA COPERTURA

13- Utilizzare progettisti, fornitori, imprese ed applicatori che siano adeguatamente istruiti ed in possesso di competenze adeguate
14- Adottare un approccio responsabile al progetto riconoscendo il valore di una copertura robusta e durevole
15- Riconoscere l'importanza di un'appropriata struttura portante
16- Assicurare un'evacuazione effettiva delle acque (meteoriche o no) per evitare i ristagni
17- Ridurre al minimo le penetrazioni attraverso la copertura
18- Assicurarsi che gli impianti tecnologici che richiedono costante manutenzione siano accessibili per la manutenzione, riparazione e/o sostituzione
19- Controllare lo sviluppo dei lavori di copertura e prendere le opportune azioni correttive
20- Controllare l'accesso alle coperture, una volta finite, al fine di ridurre perforazioni e danneggiamenti, prevedendo percorsi preferenziali e protezioni temporanee
21- Adottare una manutenzione preventiva con ispezioni periodiche e le riparazioni del caso

NOTE

I- Queste regole sono applicabili a sistemi di impermeabilizzazione delle coperture su costruzioni permanenti

II- Queste regole potranno evolvere quando si comprenderà meglio come si comportano le coperture e quale sarà il loro impatto sull'ambiente globale

B6 Ubersetzung: Deutsch

DER WEG ZU EINEM HALTBAREN DACHWERK

AUSZUG AUS DEM BERICHT DES CIB W.83/RILEM 1666 RMS VERBINDUNGSAUSSCHUSSES FÜR DACHMATERIALIEN UND –SYSTEME

Schlüsselwörter: Haltbares Dachwerk, Membran-Dachwerk, Wasserdichtigkeit, Haltbarkeit

Auszug: Ein internationaler Verbindungsausschuss wurde gegründet, um Informationen aus verschiedenen Ländern über die gegenwärtigen Gestaltungs-, Konstruktions- und Instandhaltungskriterien von Membran-Dächern zu sammeln, die Schäden für die Umwelt minimieren, zu sammeln. Die Ergebnisse sind komplex und betreffen gegenseitige Beziehungen, die derzeit noch nicht gut genug verstanden werden.

Der Verbindungsausschuss hat in einem Schriftstück von nur einer Seite eine Zusammenfassung der Schlüsselpunkte der besten Praktiken entwickelt. Diese allgemeinen Prinzipien oder „Ratschläge für ein haltbares Dachwerk“ werden angeboten zur Unterstützung von Eigentümern von Bauwerken, Konstrukteuren, Werkunternehmern oder Herstellern, welche ausgewogene Anleitungen für die Beachtung von Umweltbelangen suchen.

Der Ausschuss: Der CIB W.83/RILEM 166-RMS Verbindungsausschuss für Dachmaterialien und Systeme ist eine freiwillige und unabhängige Gruppe von anerkannten Experten und Dachwerkspezialisten aus fast 20 Ländern, die sich jährlich zwischen Mai 1996 und Oktober 2000 getroffen haben.

CIB ist die Internationale Versammlung für Bauwerk-Forschungsstudien und Dokumentation.

RILEM ist die Internationale Vereinigung für Test- und Forschungslaboratorien für Materialien und Struktur.

Hauptkontakt: Der Bericht ist in englischer Sprache erhältlich bei:
Das Sekretariat
CIB/RILEM

RATSCHLÄGE FÜR EIN HALTBARES DACHWERK

MINIMIERE DIE UMWELTBELASTUNGEN

1. Benutze Produkte welche von Rohstoffen stammen, deren Gewinnung die Umwelt am wenigsten schädigt.
2. Wähle System- und Ausführungsarbeiten, die Abfallbildung minimieren.
3. Vermeide Produkte, die zu gefährlichen Abfällen führen.
4. Beachte die regionalen klimatischen und geographischen Gegebenheiten.
5. Wo angebracht, verwende Produkte, welche wieder verwendet werden können oder recycelt.
6. Fördere den Gebrauch von „grünen Dächern“, welche die Vegetation unterstützen, besonders auf Dächern in der Innenstadt.
7. Erwäge Dachkonstruktionen, die das Aussortieren und die Bergung der Materialien am Ende der Lebenszeit eines Daches erleichtern.

ERHALTE DIE ENERGIE

8. Optimiere die wirkliche Wärmeleistung mit dem Wissen, dass durch Wärmeisolierung die Heiz- oder Kühlungskosten während der gesamten Lebensdauer des Bauwerks erheblich reduziert werden können.
9. Halte die Isolation trocken, um die Wärmeleistung und Dauerhaftigkeit des Daches zu erhalten.
10. Verwende örtliche Arbeitskräfte, Materialien und Dienstleistungen, wo immer es angebracht ist, um Transportaufwand zu reduzieren.
11. Beachte, dass die enthaltenen Energiewerte eine (von vielen) hilfreichen Maßnahmen sind, um alternative Konstruktionen zu vergleichen.
12. Bedenke die Oberflächefarbe und die –Struktur unter Berücksichtigung des Klimas und deren Auswirkungen auf Energie und Dachkonstruktionsausführung.

VERLÄNGERE DIE LEBENSDAUER DES DACHES

13. Beschäftige Planer, Zulieferer, Werkunternehmer, Handelspersonen und Geschäftsführer, die entsprechend ausgebildet sind und über die erforderlichen Fähigkeiten verfügen.
14. Verwende eine verantwortungsvolle Methode der Planung, unter Beachtung des Wertes eines robusten und haltbaren Daches.
15. Erkenne die Wichtigkeit eines ordentlich gestützten Gefüges.
16. Stelle eine effektive Entwässerung zur Verfügung, um Wasserbildungen zu vermeiden
17. Minimiere die Anzahl der Durchbrechungen des Daches.
18. Gehe sicher, dass hochgelegene Instandhaltungspunkte des Daches zugänglich sind für anfallende Reparaturen oder eine Erneuerung.
19. Überwache die Dacharbeiten in der Entwicklung, und nimmt Korrekturen vor, wenn dies erforderlich wird.
20. Kontrolliere den Zutritt auf den fertiggestellten Dächern, um Durchlöcherungen oder andere Beschädigungen zu reduzieren, indem vorgegebene Wege und zeitlich begrenzte Sicherungsmaßnahmen zur Verfügung stehen.
21. Sieh Sicherungsmaßnahmen vor, mit periodischen Untersuchungen und rechtzeitigen Reparaturen.

i: Diese Ratschläge sind anwendbar auf Dachsysteme auf dauerhaften Gebäuden.
ii. In der Art und Weise, wie die Kenntnis sich Dächer verhalten und welchen Einfluss sie auf die Gesamtumwelt haben, werden sich auch diese Leitsätze entwickeln.

International Council for Research and Innovation in Building and Construction

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CIB is a world wide network of over 5000 experts from about 500 organisations, who actively cooperate and exchange information in over 50 Commissions and Task Groups. Their scopes extend to all fields in building and construction related research and development. They are listed on the next page.

They are actively engaged in initiating projects for R&D and information exchange, organising workshops, symposia and congresses and producing publications of acknowledged global repute.

It is in their ability to bring a multi-national and multi-disciplinary approach to bear on the subject matter delineated in their Terms of Reference that is their strength.

CIB Members come from institutes, companies, partnerships and other types of organisations as well as individual experts involved in research or in the transfer or application of research results. More than 130 Universities worldwide have joined.

CIB is an Association that utilises the collective expertise of its membership to foster innovations and to create workable solutions to technical, economic, social and organisational problems within its competence.

Details on Membership and Activities are obtainable from the General Secretariat at the address above.

CIB Task Groups (TG) and Working Commissions (W)
(as at Ist January 2002)

Task Groups
TG19 Designing for the Ageing Society
TG21 Climatic Data for Building Services
TG23 Culture in Construction
TG25 Facade Systems and Technologies
TG28 Dissemination of Indoor Air Sciences (joint CIB-ISIAQ Task Group)
TG31 Macro-Economic Data for the Construction Industry
TG33 Concurrent Engineering in Construction
TG34 Regeneration of the Built Environment
TG36 Quality Assurance
TG37 Performance Based Building Regulatory Systems
TG38 Urban Sustainability
TG39 Deconstruction
TG40 Informal Settlements
TG41 Benchmarking Construction Performance
TG42 Performance Criteria of Buildings for Health and Comfort (Joint CIB-ISIAQ Task Group)
TG43 Megacities
TG44 Performance Evaluation of Buildings with Response Control Devices
TG45 Performance Indicators for Urban Development (Joint CIB-FIG Task Group)
TG46 Certification in Construction
TG47 Innovation Brokerage in Construction
TG48 Social and Economic Aspects of Sustainable Construction
TG49 Architectural Engineering
TG50 Tall Buildings

Working Commissions
W014 Fire
W018 Timber Structures
W023 Wall Structures
W040 Heat and Moisture Transfer in Buildings
W051 Acoustics
W055 Building Economics
W056 Sandwch Panels (joint CIB - ECCS Commission)
W060 Performance Concept in Building
W062 Water Supply and Drainage
W063 Affordable Housing
W065 Organisation and Management of Construction
W067 Energy Conservation in the Built Environment
W069 Housing Sociology
W070 Facilities Management and Maintenance
W077 Indoor Climate
W078 Information Technology for Construction
W080 Prediction of Service Life of Building Materials and Components (Joint CIB-RILEM Commission)
W082 Future Studies in Construction
W083 Roofing Materials and Systems (Joint CIB-RILEM Commission)

CIB Task Groups (TG) and Working Commissions (W0)
(as at Ist January 2002)

W084 Building Non-Handicapping Environments
W086 Building Pathology
W087 Post-Construction Liability and Insurance
W089 Building Research and Education
W092 Procurement Systems
W094 Design for Durability
W096 Architectural Management
W098 Intelligent and Responsive Buildings
W099 Safety and Health on Construction Sites
W100 Environmental Assessment of Buildings
W101 Spatial Planning and Infrastructure Development
W102 Information and Knowledge Management in Building (Joint CIB-UICB Commission)
W103 Construction Conflict: Avoidance and Resolution
W104 Open Building Implementation
W105 Life Time Engineering in Construction
W106 Geographical Information Systems
W107 Construction in Developing Countries

CIB HOME PAGE

WWW.CIBWORLD.NL

The CIB home page contains the following main and publicly accessible sections:

1. General Information
2. Newsletter
3. Databases

General Information

Included is General Information about CIB in the following sub-sections:

- Introduction, including among others: CIB in the past and present
- Mission Statement
- Membership which includes information on the various types of CIB Membership and on developments in the composition of the CIB Membership
- Organisation, including the composition of the CIB Board and its Standing Committees and of the CIB General Secretariat and links with the CIB Partner Organisations
- Programme of Activities
- Services to Members, and in addition the possibilities for Members to participate in CIB's Programme of Activities
- Fee System and How To Join, including the description of the current Membership Fee Levels and the option to electronically request a Membership Application Form

Newsletters

In this section electronic copies are included of the various issues of INFORMATION, the CIB Bi-Monthly Newsletter, as published over the last couple of years. Also included is an Index to facilitate searching articles on certain topics published in all included issues of INFORMATION

Databases

This is the largest section in the CIB home page. It includes fact sheets in separate on-line regularly updated databases, with detailed searchable information as concerns:

- ± 500 CIB Member Organisations, including among others: descriptions of their Fields of Activities, contact information and links with their Websites
- ± 5000 Individual Contacts, with an indication of their Fields of Expertise, photo and contact information
- ± 50 CIB Task Groups and Working Commissions, with a listing of their Coordinators and Members, Scope and Objectives, Work Programme and Planned Outputs, Publications produced so far, and Schedule of Meetings
- ± 100 Publications,originating to date from the CIB Task Groups and Working Commissions, with a listing of their contents, price and information on how to order
- ± 250 Meetings, including an indication of subjects, type of Meeting, dates and location, contact information and links with designated websites for all CIB Meetings (± 50 each year) and all other international workshops, symposia, conferences, etc. of potential relevance for people interested in research and innovation in the area of building and construction

Searchable Data: an Example

Searching for certain publications in the Databases in the CIB home page can be done in the following three ways:

1. In the home page itself a pre-selection is included of all recent CIB publications (published in the last 4 to 6 months). By clicking on "New Publications" the respective list will appear. By clicking on a title in this list the information fact sheet about this Publication will appear, including the option for an electronic order if it concerns a publication produced by the CIB Secretariat.
2. In the description of a Task Group or Working Commission in the database "Commissions" a pre-programmed selection is included of all publications produced under the responsibility of each Commission.
3. In the database "Publications" one can search, for example, for all publications on a certain topic, by simply typing the word that covers this topic in the box "Title" in the search page that appears when one asks for this database.

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