CIB-W18 Timber Structures

– A review of meetings 1–43
Part 1: Introduction

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CONTENT

1.1 Preface

Eurocode 5 is largely based on papers which has been presented and discussed at meetings in Working Commission W18 under the International Council for Building Research and Innovation, CIB.

The work have been documented in Proceedings for each of the 43 meetings since 1973. The proceedings contain more than 1000 papers and are an invaluable collection of knowledge. It has, however, only practical value if researchers and those responsible for the further development of Eurocode 5 can identify the papers relevant for the subject they are studying.

This publication contains the summary and conclusion of all CIB-W18 papers which are believed still to be of relevance, organized under more detailed headings than in the proceedings. Further is given essays which summarize the development within the major subjects.

The work has been supported by the Danish Forest and Nature Agency through a grant to Danish Timber Information. Part of the work has been done during a visit to IVALSA, the Italian Timber Technology Institute.

1.2 Introduction

The purpose of this publication is to document the basis for Eurocode 5 and to assist researchers and those responsible for the further development of Eurocode 5 to identify those of the 1000 CIB-W18 papers which are relevant for the subject they are studying.

This is achieved by

1. Giving the summary and conclusion of all CIB-W18 papers which are believed still to be of relevance, in electronic form so they are searchable and organized under more detailed headings than in the proceedings.
2. Giving essays which summarize the development within the major subjects of Eurocode 5. It is not aimed to mention all papers included, the essays focus on those that explain directly the present Eurocode provisions.

The publication consists of 6 parts.

1. Introduction
   Historical review, list of content, index, lists of papers and participants
2. Material properties
   Papers and essays on strength and stiffness of timber and wood-based materials
3. Structural members and components
   Papers and essays on the behaviour and load-carryring capacity of timber structures
4. Connections
   Papers and essays on properties of fasteners, connectors and gluede d joints
5. Special Actions
   Papers on response to seismic actions and fire
6. Essays
   Summarizing the development of the major subjects of Eurocode 5

CIB-W18 has also discussed general code questions and the development of safety codes. These are only mentioned when they are of special relevance for timber structures. Especially in the early days of CIB-W18, development of test standards and testing of materials were given high priority. These topics are however here only treated cursorily.

1.3 CIB-W18 and Eurocode 5

History

Working Commission CIB-W18 under the International Council for Building Research and Innovation, CIB (originally: Conseil International dû Batiment) was established in 1959 as a study group on timber structures, but little was achieved until 1973, except for two International Conferences in 1961 and 1965.

In 1973 the group was reorganised with John Sunley (Building Research Establishment, later TRADA, UK) as co-ordinator. The scope was defined as:

To study and highlight the major differences between the relevant national design codes and suggest ways in which the future development of these codes and standards might take place in order to minimise or eliminate these differences.

John Sunley continued as co-ordinator for 17 meetings. In 1985 he was replaced by Chris Stieda (Forintek, Canada) who continued until Hans Blass (University of Karlsruhe, Germany) took over in 1992.

Members have been specialist from Europe, Australia, Canada, New Zealand, Japan, USA and a few African and South American countries.

CIB-W18 has met at least once per year since 1973. Its latest meeting (No. 43) was held in New Zeeland in 2010.

At the meeting papers have been presented and discussed. The papers and the discussion for each meeting have been documented in Proceedings. The proceedings – in excess of 20 000 pages containing more than 1000 papers – are an invaluable collection of knowledge.

For some years CIB-W18 was split in two: CIB-W18A aimed at softwoods and CIB-W18B aimed at tropical hardwood. The latter never attracted much attention and was abandoned after a few years.

Standing:

K. Möhler (DE)	Philip Reece (UK)
Bill Curry (UK)	H. R. W. Kyhne (CH)
Marius Johansen (DK)	Odd Brynildsen (NO)
Ezra Levin (UK)	John Sunley (UK)
Bent Norén (SE)	Gerry Grainger (UK)
George Stern (USA)	Geoffrey Booth (UK)
	Jan Kuipers (NL)

Sitting:

Hans Larsen (DK)	Alan Mayo (UK), first secretary
De Freitas (Brazil)	B. Hochart (France)

First meeting in the reorganized CIB-W18 held 20-21 March 1973, Building Research Establishment, Princes Risborough, England.

Development of Eurocode 5
A first rough draft for a European Timber Design Code was presented in 1976. Further drafts were discussed at regular meetings in CIB.

A first version of CIB Structural Timber Design Code prepared by a Code drafting Committee consisting of W18 members and representatives of Confédération Européen des Industries du Bois (CEI-Bois), on the basis of comments from CIB-W18, ISO/TC165 and CEI-Bois was published by CIB in 1983.

For a period of time the CIB Structural Timber Design Code was published in two versions, one aimed at Eurocode 5 and one aimed at a global code to be published by ISO/TC 165. The plans for a global version with supporting standards was, however, abandoned around 1985, and the work was concentrated on Eurocode 5 for timber structures. A prestandard (ENV) was published in 1988. The major part of Eurocode 5 was finally published in 2004 as EN 1995-1-1.

By the end of 2010 the Eurocodes became the compulsory basis for structural design in all European countries and many other countries have adopted major parts of the Eurocodes, including Eurocode 5.

1.4 Proceedings and meetings

Each meeting is documented in a proceeding denoted by the consecutive number of the meeting. The proceedings contain
- List of participants
- Minutes
- List of papers presented at the meeting
- Current list of all CIB-W18 Papers
- Technical papers presented at the meeting

Technical papers presented to CIB-W18 are identified by a code with three numbers written like: Paper a-b-c, where:
a: denotes the number of the meeting at which the paper was presented, see list below
b: denotes the number of the subject, see list below
c: is a running number given to the papers in the order in which they appear

Example: Paper 4-10-5 refers to paper no. 5 on subject 10 presented at the fourth meeting of CIB-W18.

Meetings are numbered in chronological order:

1 Princes Risborough, England; March 1973
2 Copenhagen, Denmark; October 1973
3 Delft, Netherlands; June 1974
4 Paris, France; February 1975
5 Karlsruhe, Federal Republic of Germany; October 1975
6 Aalborg, Denmark; June 1976
7 Stockholm, Sweden; February/March 1977
8 Brussels, Belgium; October 1977
9 Perth, Scotland; June 1978
10 Vancouver, Canada; August 1978
11 Vienna, Austria; March 1979
12 Bordeaux, France; October 1979
13 Otaniemi, Finland; June 1980

14 Warsaw, Poland; May 1981
15 Karlsruhe, Federal Republic of Germany; June 1982
16 Lillehammer, Norway; May/June 1983
17 Rapperswil, Switzerland; May 1984
18 Belt Oren, Israel; June 1985
19 Florence, Italy; September 1986
20 Dublin, Ireland; September 1987
21 Parksville, Canada; September 1988
22 Berlin, German Democratic Republic; September 1989
23 Lisbon, Portugal; September 1990
24 Oxford, United Kingdom; September 1991
25 Åhus, Sweden; August 1992
26 Athens, USA; August 1993
27 Sydney, Australia; July 1994
28 Copenhagen, Denmark; April 1995
29 Bordeaux, France; August 1996
30 Vancouver, Canada; August 1997
31 Savonlinna, Finland; August 1998
32 Graz, Austria, August 1999
33 Delft, The Netherlands; August 2000
34 Venice, Italy; August 2001
35 Kyoto, Japan; September 2002
36 Colorado, USA; August 2003
37 Edinburgh, Scotland, August 2004
38 Karlsruhe, Germany, August 2005
39 Florence, Italy, August 2006
40 Bled, Slovenia, August 2007
41 St. Andrews, Canada, August 2008
42 Zurich, Switzerland, August 2009
43 Nelson, New Zealand, August 2010

The subjects are numbered as follows:

1 Limit State Design
2 Timber Columns
3 Symbols
4 Plywood
5 Strength/stress Grading
6 Stresses for Solid Timber
7 Timber Joints and Fasteners
8 Load Sharing
9 Duration of Load
10 Timber Beams
11 Environmental Conditions
12 Laminated Members
13 Panel products
14 Trussed Rafters
15 Structural Stability
16 Fire
17 Statistics and Data Analysis
18 Glued Joints
19 Fracture Mechanics
20 Serviceability
21 Test Methods
100 CIB Timber Code
101 Loading Codes
102 Structural Design Codes
103 International Standards Organisation
104 Joint Committee on Structural Safety
105 CIB Programme, Policy and Meetings
106 International Union of Forestry Research Organisations

1.5 Technical papers by subject

This list is similar to the list of current papers in the proceedings of the 43ed meeting, except that papers belonging to subjects 3 and 101 to 106 are left out. Only papers marked with a * are dealt with in this publication.

1	**Limit state design**
1-1-1	Limit State Design – H J Larsen
1-1-2	The Use of Partial Safety Factors in the New Norwegian Design Code for Timber Structures – O Brynildsen
1-1-3	Swedish Code Revision Concerning Timber Structures – B Norén
1-1-4	Working Stresses Report to British Standards Institution Committee BLCP/17/2
6-1-1	On the Application of the Uncertainty Theoretical Methods for the Definition of the Fundamental Concepts of Structural Safety – K Skov and O Ditlevsen
11-1-1	Safety Design of Timber Structures – H J Larsen
18-1-1	Notes on the Development of a UK Limit States Design Code for Timber – A R Fewell and C B Pierce
18-1-2	Eurocode 5, Timber Structures – H J Larsen
19-1-1*	Duration of Load Effects and Reliability Based Design (Single Member) – R O Foschi and Z C Yao
21-102-1	Research Activities Towards a New GDR Timber Design Code Based on Limit States Design – W Rug and M Badstube
22-1-1	Reliability-Theoretical Investigation into Timber Components Proposal for a Supplement of the Design Concept – M Badstube, W Rug and R Plessow
23-1-1*	Some Remarks about the Safety of Timber Structures – J Kuipers
23-1-2*	Reliability of Wood Structural Elements: A Probabilistic Method to Eurocode 5 Calibration – F Rouger, N Lheritier, P Racher and M Fogli
31-1-1*	A Limit States Design Approach to Timber Framed Walls – C J Mettem, R Bainbridge and J A Gordon
32-1-1*	Determination of Partial Coefficients and Modification Factors – H J Larsen, S Svensson and S Thelandersson
32-1-2*	Design by Testing of Structural Timber Components – V Enjily and L Whale
33-1-1*	Aspects on Reliability Calibration of Safety Factors for Timber Structures – S Svensson and S Thelandersson
33-1-2*	Sensitivity studies on the reliability of timber structures – A Ranta-Maunus, M Fonselius, J Kurkela and T Toratti
41-1-1*	On the Role of Stiffness Properties for Ultimate Limit State Design of Slender Columns) – Köhler, A Frangi, R Steiger
2	**Columns**
2-2-1*	The Design of Solid Timber Columns – H J Larsen
3-2-1*	The Design of Built-Up Timber Columns – H J Larsen
4-2-1*	Tests with Centrally Loaded Timber Columns – H J Larsen and S S Pedersen
4-2-2*	Lateral-Torsional Buckling of Eccentrically Loaded Timber Columns – B Johanson
5-9-1*	Strength of a Wood Column in Combined Compression and Bending with Respect to Creep – B Källsner and B Norén
5-100-1	Design of Solid Timber Columns (First Draft) – H J Larsen
6-100-1	Comments on Document 5-100-1, Design of Solid Timber Columns – H J Larsen and E Theilgaard
6-2-1	Lattice Columns – H J Larsen
6-2-2	A Mathematical Basis for Design Aids for Timber Columns – H J Burgess
6-2-3	Comparison of Larsen and Perry Formulas for Solid Timber Columns – H J Burgess
7-2-1*	Lateral Bracing of Timber Struts – J A Simon
8-15-1*	Laterally Loaded Timber Columns: Tests and Theory – H J Larsen
17-2-1*	Model for Timber Strength under Axial Load and Moment – T Poutanen
18-2-1*	Column Design Methods for Timber Engineering – A H Buchanan, K C Johns, B Madsen
19-2-1*	Creep Buckling Strength of Timber Beams and Columns – R H Leicester
19-12-2*	Strength Model for Glulam Columns – H J Blass
20-2-1	Lateral Buckling Theory for Rectangular Section Deep Beam-Columns – H J Burgess
20-2-2*	Design of Timber Columns – H J Blass
21-2-1*	Format for Buckling Strength – R H Leicester
21-2-2*	Beam-Column Formulae for Design Codes – R H Leicester
21-15-1	Rectangular Section Deep Beam - Columns with Continuous Lateral Restraint – H J Burgess

21-15-2 Buckling Modes and Permissible Axial Loads for Continuously Braced Columns – H J Burgess

21-15-3 Simple Approaches for Column Bracing Calculations – H J Burgess

21-15-4 Calculations for Discrete Column Restraints – H J Burgess

22-2-1 Buckling and Reliability Checking of Timber Columns – S Huang, P M Yu and J Y Hong

22-2-2 Proposal for the Design of Compressed Timber Members by Adopting the Second-Order Stress Theory – P Kaiser

30-2-1* Beam-Column Formula for Specific Truss Applications – W Lau, F Lam and J D Barrett

31-2-1* Deformation and Stability of Columns of Viscoelastic Material Wood – P Becker and K Rautenstrauch

34-2-1* Long-Term Experiments with Columns: Results and Possible Consequences on Column Design – W Moorkamp, W Schelling, P Becker, K Rautenstrauch

34-2-2* Proposal for Compressive Member Design Based on Long-Term Simulation Studies – P Becker, K Rautenstrauch

35-2-1* Computer Simulations on the Reliability of Timber Columns Regarding Hygrothermal Effects – R Hartnack, K U Schober, K Rautenstrauch

36-2-1* The Reliability of Timber Columns Based on Stochastical Principles – K Rautenstrauch, R Hartnack

38-2-1* Long-term Load Bearing of Wooden Columns Influenced by Climate – View on Code – R Hartnack, K Rautenstrauch

4 Plywood

2-4-1 The Presentation of Structural Design Data for Plywood – L G Booth

3-4-1 Standard Methods of Testing for the Determination of Mechanical Properties of Plywood – J Kuipers

3-4-2 Bending Strength and Stiffness of Multiple Species Plywood – C K A Stieda

4-4-4 Standard Methods of Testing for the Determination of Mechanical Properties of Plywood – Council of Forest Industries, B.C.

5-4-1 The Determination of Design Stresses for Plywood in the Revision of CP 112 – L G Booth

5-4-2 Veneer Plywood for Construction - Quality Specifications - ISO/TC 139. Plywood, Working Group 6

6-4-1 The Determination of the Mechanical Properties of Plywood Containing Defects – L G Booth

6-4-2 Comparsion of the Size and Type of Specimen and Type of Test on Plywood Bending Strength and Stiffness – C R Wilson and P Eng

6-4-3 Buckling Strength of Plywood: Results of Tests and Recommendations for Calculations – J Kuipers and H Ploos van Amstel

7-4-1 Methods of Test for the Determination of Mechanical Properties of Plywood – L G Booth, J Kuipers, B Norén, C R Wilson

7-4-2 Comments Received on Paper 7-4-1

7-4-3 The Effect of Rate of Testing Speed on the Ultimate Tensile Stress of Plywood - C R Wilson and A V Parasin

7-4-4 Comparison of the Effect of Specimen Size on the Flexural Properties of Plywood Using the Pure Moment Test – C R Wilson and A V Parasin

8-4-1 Sampling Plywood and the Evaluation of Test Results – B Norén

9-4-1 Shear and Torsional Rigidity of Plywood – H J Larsen

9-4-2 The Evaluation of Test Data on the Strength Properties of Plywood – L G Booth

9-4-3 The Sampling of Plywood and the Derivation of Strength Values (Second Draft) – B Norén

9-4-4 On the Use of the CIB/RILEM Plywood Plate Twisting Test: a progress report – L G Booth

10-4-1* Buckling Strength of Plywood – J Dekker, J Kuipers and H Ploos van Amstel

11-4-1* Analysis of Plywood Stressed Skin Panels with Rigid or Semi-Rigid Connections – I Smith

11-4-2 A Comparison of Plywood Modulus of Rigidity Determined by the ASTM and RILEM CIB/3-TT Test Methods – C R Wilson and A V Parasin

11-4-3 Sampling of Plywood for Testing Strength – B Norén

12-4-1 Procedures for Analysis of Plywood Test Data and Determination of Characteristic Values Suitable for Code Presentation – C R Wilson

14-4-1 An Introduction to Performance Standards for Wood-base Panel Products – D H Brown

14-4-2 Proposal for Presenting Data on the Properties of Structural Panels – T Schmidt

16-4-1 Planar Shear Capacity of Plywood in Bending – C K A Stieda

17-4-1 Determination of Panel Shear Strength and Panel Shear Modulus of Beech-Plywood in Structural Sizes – J Ehlbeck and F Colling

17-4-2* Ultimate Strength of Plywood Webs – R H Leicester and L Pham
20-4-1 Considerations of Reliability-Based Design for Structural Composite Products – M R O'Halloran, J A Johnson, E G Elias and T P Cunningham
21-4-1 Modelling for Prediction of Strength of Veneer Having Knots – Y Hirashima
22-4-1 Scientific Research into Plywood and Plywood Building Constructions the Results and Findings of which are Incorporated into Construction Standard Specifications of the USSR – I M Guskov
22-4-2 Evaluation of Characteristic values for Wood-Based Sheet Materials – E G Elias
24-4-1 APA Structural-Use Design Values: An Update to Panel Design Capacities – A L Kuchar, E G Elias, B Yeh and M R O'Halloran

5 Stress grading

1-5-2 Specification for Timber Grades for Structural Use - British Standard BS 4978
4-5-1 Draft Proposal for an International Standard for Stress Grading Coniferous Sawn Softwood - ECE Timber Committee
16-5-1 Grading Errors in Practice – B Thunell
16-5-2 On the Effect of Measurement Errors when Grading Structural Timber – L Nordberg and B Thunell
19-5-1 Stress-Grading by ECE Standards of Italian-Grown Douglas-Fir Dimension Lumber from Young Thinnings – L Uzielli
19-5-2 Structural Softwood from Afforestation Regions in Western Norway – R Lackner
21-5-1* Non-Destructive Test by Frequency of Full Size Timber for Grading – T Nakai
22-5-1* Fundamental Vibration Frequency as a Parameter for Grading Sawn Timber – T Nakai, T Tanaka and H Nagao
24-5-1 Influence of Stress Grading System on Length Effect Factors for Lumber Loaded in Compression – A Campos and I Smith
26-5-1* Structural Properties of French Grown Timber According to Various Grading Methods – F Rouger, C De Lafond and A El Quadrani
28-5-1* Grading Methods for Structural Timber - Principles for Approval – S Ohlsson
28-5-2 Relationship of Moduli of Elasticity in Tension and in Bending of Solid Timber – N Burger and P Glos
29-5-1* The Effect of Edge Knots on the Strength of SPF MSR Lumber – T Courchene, F Lam and J D Barrett
29-5-2* Determination of Moment Configuration Factors using Grading Machine Readings – T D G Canisius and T Isaksson
31-5-1* Influence of Varying Growth Characteristics on Stiffness Grading of Structural Timber – S Ormarsson, H Peterson, O Dahlblom and K Person
31-5-2* A Comparison of In-Grade Test Procedures – R H Leicester, H Breitinger and H Fordham
32-5-1* Actual Possibilities of the Machine Grading of Timber – K Frühwald and A Bernasconi
32-5-2* Detection of Severe Timber Defects by Machine Grading - A Bernasconi, L Boström and B Schacht
34-5-1* Influence of Proof Loading on the Reliability of Members – F Lam, S Abayakoon, S Svensson, C Gyamfi
36-5-1* Settings for Strength Grading Machines – Evaluation of the Procedure according to prEN 14081, part 2 – C Bengtson, M Fonselius
36-5-2* A Probabilistic Approach to Cost Optimal Timber Grading – J Köhler, M H Faber
36-7-11* Reliability of Timber Structures, Theory and Dowel-Type Connection Failures – A Ranta-Maunus, A Kevarinmäki
38-5-1* Are Wind-Induced Compression Failures Grading Relevant – M Arnold, R Steiger
39-5-1* A Discussion on the Control of Grading Machine Settings – Current Approach, Potential and Outlook – J Köhler, R Steiger
39-5-2* Tensile Proof Loading to Assure Quality of Finger-Jointed Structural timber – R Katzengruber, G Jeitler, G Schickhofer
40-5-1* Development of Grading Rules for Re-Cycled Timber Used in Structural Applications – K Crews
40-5-2* The Efficient Control of Grading Machine Settings – M Sandomeer, J Köhler, P Linsenmann
41-5-1 Probabilistic Output Control for Structural Timber - Fundamental Model Approach – M K Sandomeer, J Köhler, M H Faber
42-5-1* Machine Strength Grading – A New Method for Derivation of Settings – R Ziethén, C Bengtsson
43-5-1* Quality Control Methods - Application to Acceptance Criteria for a Batch of Timber - F Rouger
43-5-2* Influence of Origin and Grading Principles on the Engineering Properties of European Timber - P Stapel, J W v. d. Kuilen, A Rais

6	**Stresses for solid timber**
4-6-1	Derivation of Grade Stresses for Timber in the UK – W T Curry
5-6-1	Standard Methods of Test for Determining some Physical and Mechanical Properties of Timber in Structural Sizes – W T Curry
5-6-2	The Description of Timber Strength Data – J R Tory
5-6-3	Stresses for EC I and EC2 Stress Grades – J R Tory
6-6-1	Standard Methods of Test for the Determination of some Physical and Mechanical Properties of Timber in Structural Sizes (third draft) – W T Curry
7-6-1*	Strength and Long-term Behaviour of Lumber and Glued Laminated Timber under Torsion Loads – K Möhler
9-6-1	Classification of Structural Timber – H J Larsen
9-6-2	Code Rules for Tension Perpendicular to Grain – H J Larsen
9-6-3	Tension at an Angle to the Grain – K Möhler
9-6-4	Consideration of Combined Stresses for Lumber and Glued Laminated Timber – K Möhler
11-6-1	Evaluation of Lumber Properties in the United States – W L Galligan and J H Haskell
11-6-2	Stresses Perpendicular to Grain – K Möhler
11-6-3	Consideration of Combined Stresses for Lumber and Glued Laminated Timber (addition to Paper CIB-Wl 8/9-6-4) – K Möhler
12-6-1	Strength Classifications for Timber Engineering Codes – R H Leicester and W G Keating
12-6-2	Strength Classes for British Standard BS 5268 – J R Tory
13-6-1	Strength Classes for the C113 Code – J R Tory
13-6-2*	Consideration of Size Effects and Longitudinal Shear Strength for Uncracked Beams – R O Foschi and J D Barrett
13-6-3*	Consideration of Shear Strength on End-Cracked Beams – J D Barrett and R O Foschi
15-6-1	Characteristic Strength Values for the ECE Standard for Timber – J G Sunley
16-6-1*	Size Factors for Timber Bending and Tension Stresses – A R Fewell
16-6-2	Strength Classes for International Codes – A R Fewell and J G Sunley
17-6-1	The Determination of Grade Stresses from Characteristic Stresses for BS 5268: Part 2 – A R Fewell
17-6-2	The Determination of Softwood Strength Properties for Grades, Strength Classes and Laminated Timber for BS 5268: Part 2 – A R Fewell
18-6-1	Comment on Papers: 18-6-2 and 18-6-3 – R H Leicester
18-6-2*	Configuration Factors for the Bending Strength of Timber – R H Leicester
18-6-3	Notes on Sampling Factors for Characteristic Values – R H Leicester
18-6-4*	Size Effects in Timber Explained by a Modified Weakest Link Theory – B Madsen and A H Buchanan
18-6-5*	Placement and Selection of Growth Defects in Test Specimens – H Riberholt
18-6-6	Partial Safety-Coefficients for the Load-Carrying Capacity of Timber Structures – B Norén and J-O Nylander
19-6-1*	Effect of Age and/or Load on Timber Strength – J Kuipers
19-6-2*	Confidence in Estimates of Characteristic Values – R H Leicester
19-6-3*	Fracture Toughness of Wood - Mode I – K Wright and M Fonselius
19-6-4*	Fracture Toughness of Pine - Mode II – K Wright
19-6-5	Drying Stresses in Round Timber – A Ranta-Maunus
19-6-6	A Dynamic Method for Determining Elastic Properties of Wood – R Görlacher
20-6-1	A Comparative Investigation of the Engineering Properties of "Whitewoods" Imported to Israel from Various Origins – U Korin
20-6-2	Effects of Yield Class, Tree Section, Forest and Size on Strength of Home Grown Sitka Spruce –V Picardo
20-6-3	Determination of Shear Strength and Strength Perpendicular to Grain – H J Larsen
21-6-1*	Draft Australian Standard: Methods for Evaluation of Strength and Stiffness of Graded Timber – R H Leicester
21-6-2*	The Determination of Characteristic Strength Values for Stress Grades of Structural Timber. Part 1 – A R Fewell and P Glos
21-6-3	Shear Strength in Bending of Timber – U Korin
22-6-1*	Size Effects and Property Relationships for Canadian 2-inch Dimension Lumber – J D Barrett and H Griffin
22-6-2	Moisture Content Adjustements for In-Grade Data – J D Barrett and W Lau
22-6-3	A Discussion of Lumber Property Relationships in Eurocode 5 – D W Green and D E Kretschmann

37-6-3	Strength and Stiffness Behaviour of Beech Laminations for High Strength Glulam – P Glos, J K Denzler, P W Linsenmann
37-6-4*	A Review of Existing Standards Related to Calculation of Characteristic Values of Timber – F Rouger
37-6-5*	Influence of the Rolling-Shear Modulus on the Strength and Stiffness of Structural Bonded Timber Elements – P Fellmoser, H J Blass
38-6-1*	Design Specifications for Notched Beams in AS: 1720 – R H Leicester
38-6-2	Characteristic Bending Strength of Beech Glulam – H J Blass, M Frese
38-6-3*	Shear Strength of Glued Laminated Timber – H Klapp, H Brüninghoff
39-6-1	Allocation of Central European hardwoods into EN 1912 – P Glos, J K Denzler
39-6-2	Revisiting EN 338 and EN 384 Basics and Procedures – R Steiger, M Arnold, M Fontana
40-6-1	Bearing Strength Perpendicular to the Grain of Locally Loaded Timber Blocks – A J M Leijten, J C M Schoenmakers
40-6-2*	Experimental Study of Compression and Shear Strength of Spruce Timber – M Poussa, P Tukiainen, A Ranta-Maunus
40-6-3	Analysis of Tension and Bending strength of Graded Spruce Timber – A Hanhijdrvi, A Ranta-Maunus, H Sarkama, M Kohsaku, M Poussa, J Puttonen
41-6-1*	Design of Inclined Glulam Members with an End Notch on the Tension Face – A Asiz, I Smith
41-6-2*	A New Design Approach for End-notched Beams - View on Code – K Rautenstrauch, B Franke, S Franke, K U Schober
41-6-3*	The Design Rules in Eurocode 5 for Compression Perpendicular to the Grain – Continuous Supported Beams – H J Larsen, T A C M van der Put, A J M Leijten
41-6-4	Size Effects in Bending – J K Denzler, P Glos
42-6-1	Variability of European Spruce – A Ranta Maunus, J K Denzler
42-6-2*	Impact Loaded Structural Timber Elements Made from Swiss Grown Norway Spruce – R Widmann, R Steiger
42-6-3	Modelling the Bending Strength of Timber Components - J Köhler, M Sandomeer, T Isaksson, B Källsner
43-6-1*	The Bearing Strength of Timber Beams on Discrete Supports - A Jorissen, B de Leijer, A Leijten

7 Timber joints and fasteners

1-7-1	Mechanical Fasteners and Fastenings in Timber Structures –E G Stern
4-7-1	Proposal for a Basic Test Method for the Evaluation of Structural Timber Joints with Mechanical Fasteners and Connectors – RILEM 3TT Committee
4-7-2	Test Methods for Wood Fasteners – K Möhler
5-7-1	Influence of Loading Procedure on Strength and Slip-Behaviour in Testing Timber Joints – K Möhler
5-7-2	Recommendations for Testing Methods for Joints with Mechanical Fasteners and Connectors in Load-Bearing Timber Structures – RILEM 3 TT Committee
5-7-3	CIB-Recommendations for the Evaluation of Results of Tests on Joints with Mechanical Fasteners and Connectors used in Load-Bearing Timber Structures -J Kuipers
6-7-1	Recommendations for Testing Methods for Joints with Mechanical Fasteners and Connectors in Load-Bearing Timber Structures (seventh draft) – RILEM 3 TT Committee
6-7-2	Proposal for Testing Integral Nail Plates as Timber Joints – K Möhler
6-7-3	Rules for Evaluation of Values of Strength and Deformation from Test Results -Mechanical Timber Joints – M Johansen, J Kuipers, B Norén
6-7-4	Comments to Rules for Testing Timber Joints and Derivation of Characteristic Values for Rigidity and Strength – B Norén
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7-100-1	CIB-Timber Code Chapter 5.3 Mechanical Fasteners; CIB-Timber Standard 06 and 07 – H J Larsen
9-7-1	Design of Truss Plate Joints – F J Keenan
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11-7-1	A Draft Proposal for International Standard: ISO Document ISO/TC 165N 38E
12-7-1	Load-Carrying Capacity and Deformation Characteristics of Nailed Joints –J Ehlbeck
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13-7-2 Investigation of the Effect of Number of Nails in a Joint on its Load Carrying Ability – W Nozynski

13-7-3 International Acceptance of Manufacture, Marking and Control of Finger-jointed Structural Timber – B Norén

13-7-4 Design of Joints with Nail Plates - Calculation of Slip – B Norén

13-7-5 Design of Joints with Nail Plates - The Heel Joint – B Källsner

13-7-6 Nail Deflection Data for Design – H J Burgess

13-7-7 Test on Bolted Joints - P Vermeyden

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15-7-1 Final Recommendation TT-1 A. Testing Methods for Joints with Mechanical Fasteners in Load-Bearing Timber Structures. Annex A Punched Metal Plate Fasteners - Joint Committee RILEM/CIB-3TT

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16-7-2 Bolted Timber Joints: A Literature Survey – N Harding

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18-7-2 The Influence of the Orientation of Mechanical Joints on their Mechanical Properties – I Smith and L R J Whale

18-7-3 Influence of Number of Rows of Fasteners or Connectors upon the Ultimate Capacity of Axially Loaded Timber Joints – I Smith and G Steck

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19-7-3 Effectiveness of Multiple Fastener Joints According to National Codes and Eurocode 5 (Draft) – G Steck

19-7-4 The Prediction of the Long-Term Load Carrying Capacity of Joints in Wood Structures – Y M Ivanov and Y Y Slavic

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19-14-3* Joint Eccentricity in Trussed Rafters – T Poutanen
20-14-1* Some Notes about Testing Nail Plates Subjected to Moment Load — T Poutanen
20-14-2* Moment Distribution in Trussed Rafters – T Poutanen
20-14-3* Practical Design Methods for Trussed Rafters – A R Egerup
22-14-1* Guidelines for Design of Timber Trussed Rafters – H Riberholt
23-14-1* Analyses of Timber Trussed Rafters of the W-Type – H Riberholt
23-14-2 Proposal for Eurocode 5 Text on Timber Trussed Rafters – H Riberholt
24-14-1* Capacity of Support Areas Reinforced with Nail Plates in Trussed Rafters –A Kevarinmäki
25-14-1* Moment Anchorage Capacity of Nail Plates in Shear Tests – A Kevarinmäki and J. Kangas
25-14-2* Design Values of Anchorage Strength of Nail Plate Joints by 2-curve Method and Interpolation – J Kangas and A Kevarinmäki
26-14-1* Test of Nail Plates Subjected to Moment – E Aasheim
26-14-2* Moment Anchorage Capacity of Nail Plates – A Kevarinmäki and J Kangas
26-14-3* Rotational Stiffness of Nail Plates in Moment Anchorage – A Kevarinmäki and J Kangas
26-14-4* Solution of Plastic Moment Anchorage Stress in Nail Plates – A Kevarinmäki
26-14-5* Testing of Metal-Plate-Connected Wood-Truss Joints – R Gupta
26-14-6* Simulated Accidental Events on a Trussed Rafter Roofed Building – C J Mettem and J P Marcroft
30-14-1* The Stability Behaviour of Timber Trussed Rafter Roofs - Studies Based on Eurocode 5 and Full Scale Testing – R J Bainbridge, C J Mettern, A Reffold and T Studer
32-14-1* Analysis of Timber Reinforced with Punched Metal Plate Fasteners – J Nielsen
33-14-1* Moment Capacity of Timber Beams Loaded in Four-Point Bending and Reinforced with Punched Metal Plate Fasteners – J Nielsen
36-14-1* Effect of Chord Splice Joints on Force Distribution in Trusses with Punched Metal Plate Fasteners – P Ellegaard
36-14-2* Monte Carlo Simulation and Reliability Analysis of Roof Trusses with Punched Metal Plate Fasteners – M Hansson, P Ellegaard
36-14-3* Truss Trouble – R H Leicester, J Goldfinch, P Paevere, G C Foliente
40-14-1* Timber Trusses with Punched Metal Plate Fasteners - Design for Transport and Erection – H J Blass

15 Structural stability

8-15-1* Laterally Loaded Timber Columns: Tests and Theory – H J Larsen
13-15-1 Timber and Wood-Based Products Structures. Panels for Roof Coverings. Methods of Testing and Strength Assessment Criteria. Polish Standard BN-78/7159-03
16-15-1* Determination of Bracing Structures for Compression Members and Beams –H Brüninghoff
17-15-1 Proposal for Chapter 7.4 Bracing – H Brüninghoff
17-15-2* Seismic Design of Small Wood Framed Houses – K F Hansen
18-15-1* Full-Scale Structures in Glued Laminated Timber, Dynamic Tests: Theoretical and Experimental Studies – A Ceccotti and A Vignoli
18-15-2 Stabilizing Bracings - H Brüninghoff
19-15-1* Connections Deformability in Timber Structures: a Theoretical Evaluation of its Influence on Seismic Effects – A Ceccotti and A Vignoli

31-15-1* Seismic Performance Testing On Wood-Framed Shear Wall – N Kawai

31-15-2* Robustness Principles in the Design of Medium-Rise Timber-Framed Buildings – C J Mettem, M W Milner, R J Bainbridge and Enjily

31-15-3* Numerical Simulation of Pseudo-Dynamic Tests Performed to Shear Walls -L Daudeville, L Davenne, N Richard, N Kawai and M Yasumura

31-15-4* Force Modification Factors for Braced Timber Frames – H G L Prion, M Popovski and E Karacabeyli

32-15-1* Three-Dimensional Interaction in Stabilisation of Multi-Storey Timber Frame Buildings – S Andreasson

32-15-2* Application of Capacity Spectrum Method to Timber Houses – N Kawai

32-15-3* Design Methods for Shear Walls with Openings –C Ni, E Karacabeyli and A Ceccotti

32-15-4* Static Cyclic Lateral Loading Tests on Nailed Plywood Shear Walls – K Komatsu, K H Hwang and Y Itou

33-15-1* Lateral Load Capacities of Horizontally Sheathed Unblocked Shear Walls – C Ni, E Karacabeyli and A Ceccotti

33-15-2* Prediction of Earthquake Response of Timber Houses Considering Shear Deformation of Horizontal Frames – N Kawai

33-15-3* Eurocode 5 Rules for Bracing – H J Larsen

34-15-1* A simplified plastic model for design of partially anchored wood-framed shear walls – B Källsner, U A Girhammar, Liping Wu

34-15-2* The Effect of the Moisture Content on the Performance of the Shear Walls – S Nakajima

34-15-3* Evaluation of Damping Capacity of Timber Structures for Seismic Design – M Yasumura

35-15-1* On test methods for determining racking strength and stiffness of wood-framed shear walls – B Källsner, U A Girhammar, L Wu

35-15-2* A Plastic Design Model for Partially Anchored Wood-framed Shear Walls with Openings – U A Girhammar, L Wu, B Källsner

35-15-3* Evaluation and Estimation of the Performance of the Shear Walls in Humid Climate – S Nakajima

35-15-4* Influence of Vertical Load on Lateral Resistance of Timber Frame Walls – B Dujic, R Zarnic

35-15-5* Cyclic and Seismic Perfoiniances of a Timber-Concrete System - Local and Full Scale Experimental Results – E Fournely, P Racher

35-15-6* Design of timber-concrete composite structures according to EC5 - 2002 version – A Ceccotti, M Fragiacomo, R M Gutkowski

35-15-7* Design of timber structures in seismic zones according to EC8- 2002 version – A Ceccotti, T Toratti, B Dujic

35-15-8* Design Methods to Prevent Premature Failure of Joints at Shear Wall Corners – N Kawai, H Okiura

36-15-1 Monitoring Light-Frame Timber Buildings: Environmental Loads and Load Paths – I Smith et al.

36-15-2* Applicability of Design Methods to Prevent Premature Failure of Joints at Shear Wall Corners in Case of Post and Beam Construction – N Kawai, H Isoda

36-15-3* Effects of Screw Spacing and Edge Boards on the Cyclic Performance of Timber Frame and Structural Insulated Panel Roof Systems – D M Carradine, J D Dolan, F E Woeste

36-15-4* Pseudo-Dynamic Tests on Conventional Timber Structures with Shear Walls – M Yasumura

36-15-5* Experimental Investigation of Laminated Timber Frames with Fiber-reinforced Connections under Earthquake Loads – B Kasal, P Haller, S Pospisil, I Jirovsky, A Heiduschke, M Drdacky

36-15-6* Effect of Test Configurations and Protocols on the Performance of Shear Walls – F Lam, D Jossen, J Gu, N Yamaguchi, H G L Prion

36-15-7* Comparison of Monotonic and Cyclic Performance of Light-Frame Shear Walls – J D Dolan, A J Toothman

37-15-1* Estimating 3D Behavior of Conventional Timber Structures with Shear Walls by Pseudodynamic Tests – M Yasumura, M Uesugi, L Davenne

37-15-2* Testing of Racking Behavior of Massive Wooden Wall Panels – B Dujic, J Pucelj, R Zarnic

37-15-3* Influence of Framing Joints on Plastic Capacity of Partially Anchored Wood-Framed Shear Walls – B Källsner, U A Girhammar

37-15-4* Bracing of Timber Members in Compression – J Munch-Andersen

37-15-5* Acceptance Criteria for the Use of Structural Insulated Panels in High Risk Seismic Areas – B Yeh, T D Skaggs, T G Williamson Z A Martin

37-15-6* Predicting Load Paths in Shearwalls – Hongyong Mi, Ying-Hei Chui, I Smith, M Mohammad

38-15-1* Background Infoiniation on ISO Standard 16670 for Cyclic Testing of Connections - E Karacabeyli, M Yasumura, G C Foliente, A Ceccotti

38-15-2 Testing & Product Standards – a Comparison of EN to ASTM, AS/NZ and ISO Standards – A Ranta-Maunus, V Enjily

38-15-3* Framework for Lateral Load Design Provisions for Engineered Wood Structures in Canada – M Popovski, E Karacabeyli

38-15-4* Design of Shear Walls without Hold-Downs – Chun Ni, E Karacabeyli

38-15-5* Plastic design of partially anchored wood-framed wall diaphragms with and without openings — B Källsner, U A Girhammar

38-15-6* Racking of Wooden Walls Exposed to Different Boundary Conditions – B Dujic, S Aicher, R Zarnic

38-15-7 A Portal Frame Design for Raised Wood Floor Applications – T G Williamson, Z A Martin, B Yeh

38-15-8* Linear Elastic Design Method for Timber Framed Ceiling, Floor and Wall Diaphragms – Janno Leskelä

38-15-9* A Unified Design Method for the Racking Resistance of Timber Framed Walls for Inclusion in Eurocode 5 – R Griffiths, B Källsner, H J Blass, V Enjily

39-15-1* Effect of Transverse Walls on Capacity of Wood-Framed Wall Diaphragms – U A Girhammar, B Källsner

39-15-2* Which Seismic Behaviour Factor for Multi-Storey Buildings made of Cross-Laminated Wooden Panels? – M Follesa, M P Lauriola, C Minowa, N Kawai, C Sandhaas, M Yasumura, A Ceccotti

39-15-3* Laminated Timber Frames under dynamic Loadings – A Heiduschke, B Kasal, P Haller

39-15-4* Code Provisions for Seismic Design of Multi-storey Post-tensioned Timber Buildings – S Pampanin, A Palermo, A Buchanan, M Fragiacomo, B Deam

40-15-1 Design of Safe Timber Structures – How Can we Learn from Structural Failures? – S Thelandersson, E Frühwald

40-15-2* Effect of Transverse Walls on Capacity of Wood-Framed Wall Diaphragms–Part 2 – U A Girhammar, B Källsner

40-15-3* Midply Wood Shear Wall System: Concept, Performance and Code Implementation – Chun Ni, M Popovski, E Karacabeyli, E Varoglu, S Stiemer

40-15-4* Seismic Behaviour of Tall Wood-Frame Walls – M Popovski, A Peterson, E Karacabeyli

40-15-5* International Standard Development of Lateral Load Test Method for Shear Walls – M Yasumura, E Karacabeyli

40-15-6* Influence of Openings on Shear Capacity of Wooden Walls – B Dujic, S Klobcar, R Zarnic

41-15-1 Need for a Harmonized Approach for Calculations of Ductility of Timber Assemblies – W Munoz, M Mohammad, A Salenikovich, P Quenneville

41-15-2* Plastic Design of Wood Frame Wall Diaphragms in Low and Medium Rise Buildings – B Källsner, U A Girhammar

41 15-3 Failure Analysis of Light Wood Frame Structures under Wind Load – A Asiz, Y H Chui, I Smith

41-15-4* Combined Shear and Wind Uplift Resistance of Wood Structural Panel Shearwalls – B Yeh, T G Williamson

41-15-5* Behaviour of Prefabricated Timber Wall Elements under Static and Cyclic Loading – P Schädle, H J Blass

42-15-1* Design Aspects on Anchoring the Bottom Rail in Partially Anchored Wood-Framed Shear Walls – U A Girhammar, B Källsner

42-15-2* New Seismic Design Provisions for Shearwalls and Diaphragms in the Canadian Standard for Engineering Design in Wood - M Popovski, E Karacabeyli, Chun Ni, G Doudak, P Lepper

42-15-3* Stability Capacity and Lateral Bracing Force of Metal Plate Connected Wood Truss Assemblies – Xiaobin Song, F Lam, Hao Huang, Minjuan He

42-15-4* Improved Method for Determining Braced Wall Requirements for Conventional Wood-Frame Buildings – Chun Ni, H Rainer, E Karacabeyli

43-15-1* Influence of the Boundary Conditions on the Racking Strength of Shear Walls with an Opening - M Yasumura

43-15-2* Influence of Different Standards on the Determination of Earthquake Properties of Timber Shear Wall Systems - P Schädle, H J Blass

43-15-3 * Full-Scale Shear Wall Tests for Force Transfer Around Openings - T Skaggs, B Yeh, F Lam

43-15-4* Optimized Anchor-Bolt Spacing for Structural Panel Shearwalls Subjected to Combined Shear and Wind Uplift Forces - B Yeh, E Keith, T Skaggs

16 Fire

12-16-1 British Standard BS 5268 the Structural Use of Timber: Part 4 Fire Resistance of Timber Structures

13-100-2 CIB Structural Timber Design Code. Chapter 9. Performance in Fire

19-16-1* Simulation of Fire in Tests of Axially Loaded Wood Wall Studs – J König

24-16-1* Modelling the Effective Cross Section of Timber Frame Members Exposed to Fire – J König

25-16-1* The Effect of Density on Charring and Loss of Bending Strength in Fire – J König

25-16-2* Tests on Glued-Laminated Beams in Bending Exposed to Natural Fires – F Bolonius Olesen and J König

26-16-1* Structural Fire Design According to Eurocode 5, Part 1.2 – J König

31-16-1* Revision of ENV 1995-1-2: Charring and Degradation of Strength and Stiffness – J König

33-16-1* A Design Model for Load-carrying Timber Frame Members in Walls and Floors Exposed to Fire – J König

33-16-2* A Review of Component Additive Methods Used for the Determination of Fire Resistance of Separating Light Timber Frame Construction – J König, T Oksanen and K Towler

33-16-3* Thermal and Mechanical Properties of Timber and Some Other Materials Used in Light Timber Frame Construction - B Källsner and J König

34-16-1* Influence of the Strength Determining Factors on the Fire Resistance Capability of Timber Structural Members – I Totev, D Dakov

34-16-2* Cross section properties of fire exposed rectangular timber members – J König, B Källsner

34-16-3* Pull-Out Tests on Glued-in Rods at High Temperatures – A Mischler, A Frangi

35-16-1* Basic and Notional Charring Rates - J König

37-16-1* Effective Values of Thermal Properties of Timber and Thermal Actions During the Decay Phase of Natural Fires - J König

37-16-2* Fire Tests on Timber Connections with Dowel-type Fasteners – A Frangi, A Mischler

38-16-1* Fire Behaviour of Multiple Shear Steel-to-Timber Connections with Dowels – C Erchinger, A Frangi, A Mischler

38-16-2* Fire Tests on Light Timber Frame Wall Assemblies – V Schleifer, A Frangi

39-16-1* Fire Performance of FRP Reinforced Glulam – T G Williamson, B Yeh

39-16-2* An Easy-to-use Model for the Design of Wooden I-joists in Fire – J König, B Källsner

39-16-3* A Design Model for Timber Slabs Made of Hollow Core Elements in Fire – A Frangi, M Fontana

40-16-1* Bonded Timber Deck Plates in Fire – J König, J Schmid

40-16-2* Design of Timber Frame Floor Assemblies in Fire – A Frangi, C Erchinger

41-16-1* Effect of Adhesives on Finger Joint Performance in Fire – J König, J Norén, M Sterley

42-16-1* Advanced Calculation Method for the Fire Resistance of Timber Framed Walls – S Winter, W Meyn

42-16-2* Fire Design Model for Multiple Shear Steel-to-Timber Dowelled Connections – C Erchinger, A Frangi, M Fontana

42-16-3* Comparison between the Conductive Model of Eurocode 5 and the Temperature Distribution within a Timber Cross-section Exposed to Fire – M Fragiacomo, A Menis, P Moss, A Buchanan, I Clemente

43-16-1* Light Timber Frame Construction with Solid Timber Members - Application of the Reduced Cross-section Method – J König, J Schmid

43-16-2* Fire Exposed Cross-Laminated Timber - Modelling and Tests – J Schmid, J König, J Köhler

43-16-3* Timber-Concrete Composite Floors in Fire – J O'Neill, D Carradine, R Dhakal, P J Moss, A H Buchanan, M Fragiacomo

17 Statistics and data analysis

13-17-1* On Testing Whether a Prescribed Exclusion Limit is Attained – W G Warren

16-17-1* Notes on Sampling and Strength Prediction of Stress Graded Structural Timber – P Glos

16-17-2* Sampling to Predict by Testing the Capacity of Joints, Components and Structures – B Norén

16-17-3 Discussion of Sampling and Analysis Procedures – P W Post

17-17-1* Sampling of Wood for Joint Tests on the Basis of Density – I Smith, L R J Whale

17-17-2 Sampling Strategy for Physical and Mechanical Properties of Irish Grown Sitka Spruce – V Picardo

18-17-1* Sampling of Timber in Structural Sizes – P Glos

18-6-3 Notes on Sampling Factors for Characteristic Values – R H Leicester

19-17-1* Load Factors for Proof and Prototype Testing – R H Leicester

19-6-2* Confidence in Estimates of Characteristic Values – R H Leicester

21-6-1* Draft Australian Standard: Methods for Evaluation of Strength and Stiffness of Graded Timber – R H Leicester

21-6-2* The Determination of Characteristic Strength Values for Stress Grades of Structural Timber. Part 1 - A R Fewell and P Glos

22-17-1 Comment on the Strength Classes in Eurocode 5 by an Analysis of a Stochastic Model of Grading - A proposal for a supplement of the design concept – M Kiesel

24-17-1* Use of Small Samples for In-Service Strength Measurement – R H Leicester and F G Young

24-17-2* Equivalence of Characteristic Values – R H Leicester and F G Young

24-17-3* Effect of Sampling Size on Accuracy of Characteristic Values of Machine Grades – Y H Chuff, R Turner and I Smith

24-17-4* Harmonisation of LSD Codes – R H Leicester

25-17-2 A Body for Confirming the Declaration of Characteristic Values – J Sunley

25-17-3* Moisture Content Adjustment Procedures for Engineering Standards – D W Green and J W Evans

27-17-1* Statistical Control of Timber Strength – R H Leicester and H O Breitinger

30-17-1* A New Statistical Method for the Establishment of Machine Settings – F Rouger

35-17-1* Probabilistic Modelling of Duration of Load Effects in Timber Structures – J Köhler, S Svenson

38-17-1* Analysis of Censored Data - Examples in Timber Engineering Research – R Steiger, J Köhler

39-17-1* Possible Canadian / ISO Approach to Deriving Design Values from Test Data – I Smith, A Asiz, M Snow, Y H Chuff

18 Glued joints

20-18-1* Wood materials under combined mechanical and hygral loading A Mårtensson, S Thelandersson

20-18-2* Analysis of Generalized Volkersen - Joints in Terms of Linear Fracture Mechanics – P J Gustafsson

20-18-3* The Complete Stress-Slip Curve of Wood-Adhesives in Pure Shear - H Wernersson and P J Gustafsson

22-18-1 Perspective Adhesives and Protective Coatings for Wood Structures – A S Freidin

34-18-1* Performance Based Classification of Adhesives for Structural Timber Applications – R J Bainbridge, C J Mettem, J G Broughton, A R Hutchinson

35-18-1* Creep Testing Wood Adhesives for Structural Use – C Bengtson,B Källander Testing

38-18-1* Adhesive Performance at Elevated Temperatures for Engineered Wood Products – B Yeh, B Herzog, T G Williamson

39-18-1* Comparison of the Pull–out Strength of Steel Bars Glued in Glulam Elements Obtained Experimentally and Numerically – V Rajcic, A Bjelanovic, M Rak

39-18-2* The Influence of the Grading Method on the Finger Joint Bending Strength of Beech – M Frese, H J Blass

43-18-1* Comparison of API, RF and MUF Adhesives Using a Draft Australian/New Zealand Standard – B Walford

19 Fracture mechanics

21-10-1* A Study of Strength of Notched Beams – P J Gustafsson

22-10-1* Design of Endnotched Beams – H J Larsen and P J Gustafsson

23-10-1* Tension Perpendicular to the Grain at Notches and Joints – T A C M van der Put

23-10-2* Dimensioning of Beams with Cracks, Notches and Holes. An Application of Fracture Mechanics – K Riipola

23-19-1 Determination of the Fracture Energie of Wood for Tension Perpendicular to the Grain – W Rug, M Badstube and W Schöne

23-19-2 The Fracture Energy of Wood in Tension Perpendicular to the Grain. Results from a Joint Testing Project – H J Larsen and P J Gustafsson

23-19-3 Application of Fracture Mechanics to Timber Structures – A Ranta-Maunus

24-19-1 The Fracture Energy of Wood in Tension Perpendicular to the Grain – H J Larsen and P J Gustafsson

28-19-1 Fracture of Wood in Tension Perpendicular to the Grain: Experiment and Numerical
Simulation by Damage Mechanics – L Daudeville, M Yasumura and J D Lanvin

28-19-2 A New Method of Determining Fracture Energy in Forward Shear along the Grain – H D Mansfield-Williams

28-19-3 Fracture Design Analysis of Wooden Beams with Holes and Notches. Finite Element Analysis based on Energy Release Rate Approach – H Peterson

28-19-4 Design of Timber Beams with Holes by Means of Fracture Mechanics – S Aicher, J Schmidt and S Brunold

30-19-1 Failure Analysis of Single-Bolt Joints – L Daudeville, L Davenne and M Yasumura

37-19-1 Determination of Fracture Mechanics Parameters for Wood with the Help of Close Range Photogrammetry – S Franke, B Franke, K Rautenstrauch

39-19-1 First Evaluation Steps of Design Rules in the European and German codes of Transverse Tension Areas – S Franke, B Franke, K Rautenstrauch

20 Serviceability

27-20-1* Codification of Serviceability Criteria – R H Leicester

27-20-2* On the Experimental Determination of Factor k_{def} and Slip Modulus k_{ser} from Short-and Long-Term Tests on a Timber-Concrete Composite (TCC) Beam - S Capretti and A Ceccotti

27-20-3* Serviceability Limit States: A Proposal for Updating Eurocode 5 with Respect to Eurocode 1 – P Racher and F Rouger

27-20-4* Creep Behavior of Timber under External Conditions – C Le Govic, F Rouger, T Toratti and P Morlier

30-20-1* Design Principles for Timber in Compression Perpendicular to Grain – S Thelandersson and A Mårtensson

30-20-2* Serviceability Performance of Timber Floors - Eurocode 5 and Full Scale Testing – R J Bainbridge and C J Mettem

32-20-1* Floor Vibrations – B Mohr

37-20-1* A New Design Method to Control Vibrations Induced by Foot Steps in Timber Floors – Lin J Hu, Y H Chui

37-20-2* Serviceability Limit States of Wooden Footbridges. Vibrations Caused by Pedestrians – P Hamm

43-20-1* The Long Term Instrumentation of a Timber Building in Nelson NZ - the Need for Standardisation - H W Morris, S R Uma, K Gledhill, P Omenzetter, M Worth

21 Test methods

31-21-1* Development of an Optimised Test Configuration to Determine Shear Strength of Glued Laminated Timber – G Schickhofer and B Obermayr

31-21-2 An Impact Strength Test Method for Structural Timber. The Theory and a Preliminary Study – T D G Canisius

35-21-1* Full-Scale Edgewise Shear Tests for Laminated Veneer Lumber – B Yeh, T G Williamson

39-21-1 Timber Density Restrictions for Timber Connection Tests According to EN28970/1SO8970 – A Leijten, J Köhler, A Jorissen

39-21-2 The Mechanical Inconsistence in the Evaluation of the Modulus of Elasticity According to EN384 – T Bogensperger, H Unterwieser, G Schickhofer

40-21 -1 ASTM D 19 8 - Interlaboratory Study for Modulus of Elasticity of Lumber in Bending – A Salenikovich

40-21 -2 New Test Configuration for CLT-Wall-Elements under Shear Load – T Bogensperger, T Moosbrugger, G Schickhofer

41-21-1 Determination of Shear Modulus by Means of Standardized Four-Point Bending Tests – R Brandner, B Freytag, G Schickhofer

43-21-1* Estimation of Load-Bearing Capacity of Timber Connections – J Munch-Andersen, J D Sørensen, F Sørensen

43-21-2* A New Method to Determine Suitable Spacings and Distances for Self-tapping Screws – T Uibel, H J Blalss

100 CIB Timber code

2-100-1 A Framework for the Production of an International Code of Practice for the Structural Use of Timber – W T Curry

5-100-1 Design of Solid Timber Columns (First Draft) – H J Larsen

5-100-2 A Draft Outline of a Code for Timber Structures – L G Booth

6-100-1 Comments on Document 5-100-1; Design of Solid Timber Columns – H J Larsen and E Theilgaard

6-100-2 CIB Timber Code: CIB Timber Standards – H J Larsen and E Theilgaard

7-100-1 CIB Timber Code Chapter 5.3 Mechanical Fasteners; CIB Timber Standard 06 and 07 – H J Larsen

8-100-1 CIB Timber Code - List of Contents (Second Draft) – H J Larsen

9-100-1 The CIB Timber Code (Second Draft)

11-100-1 CIB Structural Timber Design Code (Third Draft)

11-100-2 Comments Received on the CIB Code – U Saarelainen; Y M Ivanov, R H Leicester, W Nozynski, W R A Meyer, P Beckmann; – R Marsh

11-100-3 CIB Structural Timber Design Code; Chapter 3 – H J Larsen

12-100-1 Comment on the CIB Code - Sous-Commission Glulam

12-100-2 Comment on the CIB Code – R H Leicester

12-100-3 CIB Structural Timber Design Code (Fourth Draft)

13-100-1 Agreed Changes to CIB Structural Timber Design Code
13-100-2 CIB Structural Timber Design Code. Chapter 9: Performance in Fire
13-100-3a Comments on CIB Structural Timber Design Code
13-100-3b Comments on CIB Structural Timber Design Code – W R A Meyer
13-100-3c Comments on CIB Structural Timber Design Code – British Standards Institution
13-100-4 CIB Structural Timber Design Code. Proposal for Section 6.1.5 Nail Plates – N I Bovim
14-103-2 Comments on the CIB Structural Timber Design Code – R H Leicester
15-103-1 Resolutions of TC 165-meeting in Athens 1981-10-12/13
21-100-1 CIB Structural Timber Design Code. Proposed Changes of Sections on Lateral Instability, Columns and Nails – H J Larsen
22-100-1 Proposal for Including an Updated Design Method for Bearing Stresses in CIB W 18 -Structural Timber Design Code – B Madsen
22-100-2 Proposal for Including Size Effects in CIB W 18A Timber Design Code – B Madsen
22-100-3 CIB Structural Timber Design Code - Proposed Changes of Section on Thin-Flanged Beams – J König
22-100-4 Modification Factor for "Aggressive Media" - a Proposal for a Supplement to the CIB Model Code – K Erler and W Rug
22-100-5 Timber Design Code in Czechoslovakia and Comparison with CIB Model Code – P Dutko and B Kozelouh

1.6 Participants per country

Acronyms	
APA	American Plywood Association
BFH	Federal Res. Centre for Forestry and Forest Products
BRE	Building Research Establishment
CEI-BOIS	European Confederation of woodworking industries
COFI	Council of Forest Industries
CTBA	Centre Technique du Bois et de l'Ameublement
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CUST	Centre Universitaire des Sciences et Techniques
FCBA	l'Institut Technologique Forêt Cellulose Bois-construction Ameublement
FMPA	Swiss Federal Laboratories for Materials Testing and Research
ETH	Eidgenössische Technische Hochschule Zürich
FORINTEK	Canada Wood Products Research Institute
ISO	International Organization for Standardization
IVALSA	Trees and Timber Institute
LMT	Laboratoire de Mecanique et Technologie,
LRBB	Laboratoire de Rhéologie du Bois de Bordeaux
SP	Technical Research Institute of Sweden
TRADA	Timber Research and Development Association
TU	Technical University / Techniche Universität
UBC	University of British Columbia
UNIDO	United Nations Industrial Development Organization
USDA	US Department of Agriculture
VTT	Technical Research Centre of Finland

Name	Initials	Affiliation	Meetings
Australia			
Becket	R	New South Wales Inst. of Techn.	19
Breitinger	H O	CSIRO	27
Bolden	S A	Pine Australia	27
Boughton	G	Curtin University of Techn.	21, 27, 31
Callander	M	University of Technology, Sydney	27
Chelberg	R W	Forest and Wood products, Sunnybank	31
Clancy	P	Dept. Civ. and Build.Eng., Melbourne	30
Crews	K	University of Technology, Sydney	31, 37, 39, 40, 42, 43
Daziel	L	CADE Systems, Koo Wee Rup	43
Horrigan	A	Queensland Forestry Research Inst.	31
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NB: Non CIB-members participating in meeting 22 in East Berlin in 1989 is not included in the list.

1.7 Participants per meeting

MEETING 1

AUSTRALIA
R H Leicester[1]

BRAZIL
A R de Freitas

DENMARK
M Johansen
H J Larsen

FRANCE
B Hochart

NETHERLANDS
J Kuipers

NORWAY
O Brynildsen

SWEDEN
B Norén

SWITZERLAND
H R W Kühne

UK
L C Booth
W T Curry
G D Grainger
E Levin
P O Reece
J G Sunley[2]

WEST GERMANY
K Möhler

USA
E G Stern

[1] Corresponding delegate

[2] Coordinator W18 and Chairman for meeting

MEETING 2

CANADA
C K A Stieda

DENMARK
T Feldborg
M Johansen
H J Larsen
A R Egerup
P Hoffmeyer
H Riberholt
H P Steenfos
B Lav

FRANCE
P Crubilé

GERMANY
H Kolb

NETHERLANDS
J Kuipers

NORWAY
O Brynildsen

SWEDEN
B Norén

UK
L G Booth
H J Burgess
E Levin
W T Curry
A P Mayo[3]
J G Sunley[2]
R Marsh
P Steer

[2] Coordinator W18 and Chairman for meeting
[3] Secretary W18

MEETING 3

BELGIUM
P Sonnemans

CANADA
C R Wilson
D E Kennedy

DENMARK

M Johansen
H J Larsen
A R Egerup
H Riberholt

FRANCE
P Crubilé

GERMANY
H Kolb
K Möhler

NETHERLANDS
D Korfker
J Kuipers
H Ploos van Amstel
P Vermeyden
K Griffioen
A van der Velden
E J Heidema

NORWAY
O Brynildsen

SWEDEN
B Norén

SOUTH AFRICA
J A Simon

UK
L G Booth
H J Burgess
E Levin
W T Curry
A P Mayo[3]
J G Sunley[2]
R Marsh

MEETING 4

BELGIUM
P Sonnemans
A Visser

DENMARK
M Johansen
H J Larsen

FINLAND
U Saarelainen

FRANCE
P Crubilé
A R Hue

GERMANY
K Möhler

NETHERLANDS
J Kuipers

NORWAY
O Brynildsen

SWEDEN
B Norén

UK
H J Burgess
E Levin
W T Curry
A P Mayo
J G Sunley
R Marsh
P O Reece

USSR
L O Leparsky

MEETING 5

BELGIUM
P Sonnemans

CANADA
C R Wilson

DENMARK
M Johansen
H J Larsen

FINLAND
U Saarelainen

FRANCE
P Crubilé

GERMANY
J Ehlbeck
K Hemmer
K Möhler
G Steck
H Kolb

NETHERLANDS
J Kuipers

NORWAY
O Brynildsen

SWEDEN
B Norén

UK
L G Booth
H J Burgess
W W L Chan
W T Curry
A P Mayo
J G Sunley
R Marsh
T Williams

MEETING 6

BELGIUM
A Visser

CANADA
R Foschi
B Madsen
C Wilson

DENMARK
T Feldborg
P Hoffmeyer
M Johansen
H J Larsen

FINLAND
U Saarelainen

FRANCE
P E H Crubilé

FEDERAL REPUBLIC
OF GERMANY
P Frech
K Möhler

NETHERLANDS
J Kuipers
H Ploos van Amstel

NORWAY
P Aune
O Brynildsen
O B Kristiansci

SOUTH AFRICA
P A V Bryant

SWEDEN
B Norén

UK
H J Burgess
W T Curry
L G Booth
R Marsh
J G Sunley
J R Tory
T Williams

USA
R Pellerin
E G Stern

MEETING 7

AUSTRIA
E Armbruster

BELGIUM
L Montfort
H Riberholt
A Visser

CANADA
C R Wilson

DENMARK
M Johansen
H J Larsen

FINLAND
E Niskanen
T Rechardt
U Saarelainen

FEDERAL REPUBLIC
OF GERMANY
P Frech
K Möhler
P Taylor

NETHERLANDS
J Kuipers

NORWAY
P Aune
O Brynildsen
O B Kristiansen

FRANCE
P E H Crubilé

POLAND
B Bany
W Nozynski

SOUTH AFRICA
J Simon

SWEDEN
H Edlund
T Englesson
B Johannesson
C Johansson
B Källsner
B Norén
B Robens
T Schmidt
B Thunell
H Wickholm

UK
L G Booth
H J Burgess
W T Curry
P Grimsdale
R March
J G Sunley
J R Tory
T Williams

USA
D H Brown

MEETING 8

AUSTRIA
E Armbruster

BELGIUM
E Broeckx
A Ingelaere
L Montfort

CANADA
C R Wilson

DENMARK
M Johansen
H J Larsen

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FEDERAL REPUBLIC
OF GERMANY
P Frech
H Kolb
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P Crubilé

NETHERLANDS
J Kuipers

NORWAY
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SOUTH AFRICA
T Williams

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B Edlund
B Norén
B Thunell

UK
L G Booth
H J Burgess
W T Curry
P Grimsdale
R Marsh
J G Sunley
J R Tory

MEETING 9

AUSTRIA
E Armbruster

BELGIUM
A R Egerup
CANADA
J D Barrett
N Donkervoort
T A Eldridge
F J Keenan

DENMARK
M Johansen
H J Larsen

FEDERAL REPUBLIC
OF GERMANY
K Hemmer Kolb

FRANCE
P E H Crubilé

IRLAND
V Picardo

NETHERLANDS
J Kuipers

NORWAY
N I Bovim
O B Kristiansen

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W Marosz
W Nozynski

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B Edlund
B Norén
B Thunell

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L G Booth
H J Burgess
W T Curry
P Grimsdale
P G Jackson
R Marsh
R A Swann
J G Sunley
J R Tory

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F T Kurpiel

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A R Egerup

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D Barrett
T A Eldridge
E Fowler
C R Henderson
B Madsen
D R Meeks
P Nielsen
J Stevenson
H Vokey
C R Wilson

DENMARK
H J Larsen

FRANCE
P E H Crubilé

FEDERAL REPUBLIC
0F GERMANY
J Ehllbeck
M Kufner

JAPAN
T Nakai
NETHERLANDS
J Kuipers

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L G Booth
J G Sunley
J R Tory

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E G Stern

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J G Centeno

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R O Foschi
C R Wilson

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J Ehlbeck
K Hemmer
D Henrici
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E Pennala,

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J Kuipers
W R A Meyer

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W Marosz
Z Mielczarek
W NOZYNSKI

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R Marsh
J G Sunley
J R Tory

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W L Galligan
P Taylor

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E Armbruster

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L Montfort

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J Ehlbeck
H Kolb
K Möhler

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U Saarelainen

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P E H Crubilé

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P R Colclough

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J Kuipers
T A Van der Put

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N I Bovim

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W Marosz
W Nozynski

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J R Tory

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T A Eldridge
C K Stieda

DENMARK
A Egerup
M Johansen
H J Larsen
H Riberholt

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F Kallioniemi
J Kangas
E K Leppävuori
E Pennala
T Poutanen
U Saarelainen

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H Brüninghoff
J Ehlbeck
K Möhler

FRANCE
P Crubilé
M Escudié-Calvignac

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J Kuipers

NORWAY
E Aasheim
N I Bovim

POLAND
W Marosz
Z Mielczarek
W Nozynski

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B Edlund
B Källsner
B Norén

SWITZERLAND
E Gehri
U A Meierhofer

USSR
A Zamarev

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L G Booth
H J Burgess
W W Chan
W T Curry
J G Sunley
J R Tory

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V Ellebracht
G Stern

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S Kus
W Marosz
Z Mielczarek
W Nozynski
B Scypenshe

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B Norén

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J R Tory

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V Ellebracht
G Stern

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R O Foschi
B Madsen

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M Johansen
H Riberholt

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H Brüninghoff
F Colling
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L Lükge
K Möhler
P Müller
W Siebert
G Steck
E Stengelin
J Wenz

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E Pennala
T Poutanen
U Saarelainen

ISRAEL
U Korin

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J Kuipers

NORWAY
E Aasheim

SOUTH AFRICA
F R P Pienaar

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B Edlund
U A Girhammar
B Källsner

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E Gehri
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J Tory
R Verhorst

UNITED STATES
B Baker
E G Stern

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R S Beckett

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G A Dring
C K A Stieda

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E K Leppavuori
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V Picardo

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U Korin

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NORWAY
E Aasheim
P Aune
0 Brynildsen
R Lackner
P H Leirtun
K Mørkved
T Ø Rams tad

SWEDEN
B Edlund
B Kallsnner
B Norén
B Thunell

SWITZERLAND
U A Meierhofer

UK
H J Burgess
I D G Lee
R Marsh
R C Mitzner
J G Sunley
J Tory

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W A Baker
P W Post

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R Beckett
D T Fawcett

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T A Eldridge
C K A Stieda

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A Egerup
M Johansen
H Ri berholt

FEDERAL REPUBLIC OF GERMANY
H Brüninghoff
J Ehbeck
E Apple
P Glos
G Steck

FINLAND
J Kangas
E K Leppavuori
T Poutanen
U Saareleinen

ISRAEL
U Korin

NETHERLANDS
J Kuipers

NORWAY
E Aasheim
R Lackner
P H Leirtun
T Ø Ramstad

SWEDEN
B Edlund
U Girhammer
B Källsner
B Norén
B Thunell

SWITZERLAND
E Gehri
U A Meierhofer
J Natterer
W Winter

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H J Burgess
A Fewell
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J G Sunley

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D Cresswell

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BELGIUM
M G R Verhorst

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B Madsen
C Stieda

DENMARK
M Johansen
H J Larsen
H Riberholt

FEDERAL REPUBLIC OF GERMANY
H Brüninghoff
J Ehlbeck
P Glos

FINLAND
J Kangas
T Poutanen

IRELAND
P R Colclough

ISRAEL
U Korin

ITALY
A Ceccotti
A Vignoli

NETHERLANDS
J Kuipers

NORWAY
E Aasheim
P H Leirtun
T Ø Ramstad

SWEDEN
J Brundin
B Edlund
B Källsner
B Norén
B Thunell

SWITZERLAND
U A Meierhofer

UK
H J Burgess
R F Marsh
I Smith
J G Sunley
J Tory

USA
D H Brown
E G Stern

MEETING 19

AUSTRALIA
R Beckett
R H Leicester

AUSTRIA
R Hallett

CANADA
L Bach
R O Foschi
K Johns
B Madsen
L Palka
C K A Stieda

DENMARK
A Egerup
T Feldborg
P Hoffmeyer
C Kondrup
H J Larsen
H Riberholt

FEDERAL REPUBLIC
OF GERMANY
H J Blass
H Brüninghoff
F Lolling
J Ehlbeck
P Glos
R Görlacher
G Steck

FINLAND
J Kangas
T Poutanen
A Ranta-Maunus
K Wright

FRANCE
A H Hamou
P Crubilé

IRELAND
P Colclough

ISRAEL
U Korin
S Peer

ITALY
G Cardinale

A Ceccotti
G Giordano
G U Marchi
L Paolini
M Pasanisi
M Piazza
M Ruffino
P Sieni
P Spinelli
G Tampone
L Uzielli
A Vignoli
F Zaupa

JAPAN
Y Hirashima
M Yasumura

NETHERLANDS
J Kuipers
T van der Put

NORWAY
E Aasheim
P Aune
R Lackner

SWEDEN
J Brundin
B Edlund
B Källsner
R Kliger
J König
B Norén
T Schmidt
B Thunell

SWITZERLAND
U Meierhofer
M Kessel

UK
G Booth
H Burgess
A R Fewell
R Marsh
J G Sunley
L Whale

MEETING 20

AUSTRALIA
D R Syme

CANADA
I Smith
C K A Stieda

DENMARK
T Feldborg
P Hoffmeyer
H J Larsen
H Riberholt

FEDERAL REPUBLIC
OF GERMANY
H J Blass
H Brüninghoff
J Ehlbeck
P Glos

FINLAND
R Kytomäki
T Poutanen
A Ranta-Maunus
U Saarelainen

FRANCE
P Crubilé

IRELAND
P R Colclough
V Picardo
W J Robinson

ISRAEL
U Korin

ITALY
A Ceccotti
L Uzielli
A Vignoli

JAPAN
M Yasumura

NETHERLANDS
J Kuipers

NORWAY
E Aasheim
O A Brynildsen

PORTUGAL
P M Pontific de Sousa

SWEDEN
B Källsner
J König
A Mårtensson
S Mohager
S Thelandersson

SWITZERLAND
U A Meierhofer

UK
H J Burgess
Y H Chui
A R Egerup
A R Fewell
R Marsh
C J Mettem
J G Sunley
L Whale

USA
E G Elias
M R H'Halloran
E G Stern

ZIMBABWE
W R Mackechnie

MEETING 21

AUSTRALIA
G Boughton
R H Leicester

CANADA
J D Barrett
RFouquet
Y H Chui
C Lum
B Madsen
D J Masse
D Onysko
J J Salinas
I Smith
C K A Stieda
E Varoglu

DENMARK
T Feldborg
H J Larsen
H Riberholt

FEDERAL REPUBLIC OF GERMANY
H J Blass
J Ehlbeck
P Glos

FINLAND
M Fonselius
T Poutanen
A Ranta-Mauni
K Riipola
U Saarelainen

DDR
W Rug

IRELAND
P R Colclough

ISRAEL
U Korin

ITALY
A Ceccotti

JAPAN
Y Hirashima
K Komatsu
T Nakai
M Yasumura

NETHERLANDS
J Kuipers
A J M Leijten

NEW ZEALAND
A H Buchanan
G B Watford

NORWAY
E Aasheim
P Aune
T Ramstad

SWEDEN
L Boström
A Girhammar
P J Gustafsson
G Johansson
B Källsner
U König
S Mohager
S Ohlsson
S Thelandersson
B Thunell

SWITZERLAND
U A Meierhofer

UK
A R Abbott
H J Burgess
A R Fewell
R Marsh
R C Mitzner
J G Sunley
L R J Whale

USA
E G Elias
D W Green Johnson
E G Stern

MEETING 22 - CIB W18 members

CANADA
J D Barrett
E Karacabeyli
B Madsen
V Mathur
C K A Stieda

DENMARK
H J Larsen.
T Feldborg
H Riberholt

FEDERAL REPUBLIC OF GERMANY
H Brüninghof
O Eberhart
J Ehlbeck
M Gerold
P Glos
H Werner

FINLAND
I Absek
JKangas
TToratti

FRANCE
P Racher
F Rouger

DDR
W Rug

ITALY
G Bignotti
A Ceccotti
A Vignoli

JAPAN
T Nakai
M Yasumura

NETHERLANDS
A J M Leijten

NORWAY
E Aasheim

SWEDEN
B Edlund
U Girhammar
B Hedlund
B Källsner
J König
S Mohager

UK
A R Abbott
H T Burgess
A R Fewell
C J Mettem
R F Marsh
J G Sunley

USA
B Douglas
E Elias
D W Green
R C Mitzner

MEETING 22 - NON CIB W18 members

CZECHOSLOWAKIA
P Dutko
B Kozelough
V Mahuliak
A Pozgai
J Sedlar

DDR
R Apitz
M Badstube
E Delock
K Erler Fischer
K Geier
Grimm
T Hanack
B Hertel
Hoeher
P Kaiser
M Kiesel

DDR (continued)
E Koitzsch
E Kothe
L Krahmer
W Kreissig
U Laduch
K Lissner
S Patzig
R Plessow
K Schulze
A Seemann
R Siemoneit
W Vogt
K H Zimmer

HUNGARY
A Josza
F Ronai

POLAND
B Bany
R Ganowicz
J Kerste
Z Mielczarek
W Nozynsky

USSR
Baltrusati
A S Freidin
L Kowaltschul
T Lomakin
Y Slavik
S B Turkowski

MEETING 23

BELGIUM
J Rathe

CANADA
J D Barrett
H Griffin
C K A Stieda

DENMARK
A Egerup
T Feldborg
H J Larsen
H Riberholt

FINLAND
J Kangas
A Ranta-Maunus
K Riipola

FRANCE
F Rouger
A Vergne

GERMANY
H J Blass
H Brüninghoff
F Lolling
J Ehlbeck
W Rug

ISRAEL
U Korin

ITALY
G Bignotti
A Ceccotti
N de Robertis

JAPAN
Y Hirashima
M Yasumura

NETHERLANDS
J Kuipers
A J M Leijten
T C van der Put

NORWAY
E Aasheim
T Ramstad

PORTUGAL
P P De Sousa

SWEDEN
B Edlund
U A Girhammar
B Källsner
J König
S Mohager
S Ohlsson
S Thelandersson

SWITZERLAND
U A Meierhofer

UK
A R Abbott
H J Burgess
V Enjily
A Fewell
J P Marcroft
R F Marsh
C J Mettem
J G Sunley
L R J Whale

USA
E G Elias
D W Green
R R Kincaid
M R O'Hallorar
E G Stern
M F Stone

MEETING 24

AUSTRALIA
R H Leicester

CANADA
E M Aplin
J D Barrett
H Griffin
B Madsen
I Smith
C K A Stieda

DENMARK
A Egerup
T Feldborg
H J Larsen
H Riberholt

FINLAND
J Kangas
A Kevarinmaki
A Ranta-Maunus
T Toratti

FRANCE
E Fournely
C Legovic
F Rouger

GERMANY
S Aicher
F Colling
J Ehlbeck
P Glos
R Görlacher
J Kurth
I W Rug

IRELAND
P R colclough
V Picardo

ISRAEL
U Korin

ITALY
A Ceccotti
N de Robertis

JAPAN
Y Hirashima
M Yasumura

MOROCCO
E Kortbi

NEW ZEALAND
A Buchanan
P J Moss
B Walford

NETHERLANDS
H J Blass
A J M Leijten
J W G van de Kuilen
T C van der Put
G Sebestyen

NORWAY
E Aasheim

POLAND
Z Mielczarek
B Szyperska

PORTUGAL
H Cruz

SWEDEN
I Czmoch
B L O Edlund
B Källsner
R Kliger
J König
M Perstorper
S Thelandersson

SWITZERLAND
E Gehri

UK
A R Abbott
B S Choo
V Enjily
A Fewell
H Griffin
R R Kincaid
I Lee
R Lovegrove
J P Marcroft
R F Marsh
C Marx
C J Mettem
J G Sunley
L R J Whale
A V Page

USA
R Anthony
E G Elias
B Falk
A L Kuchar
M R O'Halloran
D G Pollock
E G Stern

MEETING 25

CANADA
B Madsen
C K A Stieda

DENMARK
A Egerup
H J Larsen

FINLAND
J Kangas
A Kevarinmaki
A Ranta-Maunus
T Poutanan

FRANCE
F Rouger

GERMANY
H Brüninghoff
F Colling
J Ehlbeck
R Görlacher
M Schläger
H Werner

ISRAEL
U Korin

ITALY
A Ceccotti

JAPAN
M Yasumura
K Komatsu

NETHERLANDS
H J Blass
J W G van de Kuilen

NORWAY
E Aasheim

POLAND
Z Mielczarek

SWEDEN
B L O Edlund
B Källsner
J König
S Thelandersson
H Petersson
S Ohlsson
P J Gustafsson
A Mårtensson

SWITZERLAND
E Gehri

UK
A R Abbott
B S Choo
A R Fewell
C J Mettem
J G Sunley
T D G Canisius

USA
M R O'Halloran
E G Stern
T E McLain
D W Green
R Falk
J Showalter
T Williamson

MEETING 26

CANADA
C Lum
I Smith
C K A Stieda.

DENMARK
A Egerup
H J Larsen

FINLAND
J Kangas
A Kevarinmäki
T Poutanen

FRANCE
F Rouger

GERMANY
J Ehlbeck
R Görlacher

ITALY
A Ceccotti

NETHERLANDS
H J Blass

NORWAY
E Aasheim

SWEDEN
B Källsner
J König
A Mårtensson
S Thelandersson

SWITZERLAND
E Gehri
U Meierhofer

UK
A R Abbott
A R Fewell
C J Mettem
J Park

USA
P Chow
J D Dolan
E Elias
R Falk
D W Green
R Gupta
M R O'Halloran
J Showalter
E G Stern
T Williamson

MEETING 27

AUSTRALIA
S A Bolden
G Boughton
H O Breitinger
M Callander
W Joe
R H Leicester
J P Lu
G R Stringer

CAMEROON
O Avina

CANADA
E Karacabeyli
C Lum

CHILE
L Leiva

DENMARK
H J Larsen

FINLAND
A Ranta-Maunus
S Koponen
T Poutanen
T Toratti

FRANCE
F Rouger
P Monier

GERMANY
J Ehlbeck
R Görlacher
J Kurth
H Werner

ISRAEL
U Korin

ITALY
S Capretti
A Ceccotti

JAPAN
K Horie
K Komatsu
T Nakai

KOREA
S Jang

NETHERLANDS
H J Blass
W Gard
A D Leijten

NEW ZEALAND
P Simperingham
A King
J Williamson

NORWAY
E Aasheim

SWEDEN
L Boström
J Brundin
G Johansson
B Källsner
J König
A Mårtensson
H Petersson
S Thelandersson

UK
V Enjily
A R Fewell
C J Mettem
L Whale

USA
D Kretschmann
M Ritter
T Williamson

MEETING 28

CANADA
J D Barrett
E Karacabeyli
F Lam
B Madsen

DENMARK
A Egerup
P Hoffrneyer
H J Larsen

FINLAND
J Kangas
A Ranta-Maunus
K Riipola
T Poutanen

FRANCE
P Galimard
F Rouger

GERMANY
N Burger
J Ehlbeck
R Görlacher
H Kreuzinger
H Werner

ITALY
A Ceccotti

JAPAN
M Yasumura

NETHERLANDS
H J Blass
J Kuipers
A D Leijten

NORWAY
P Aune
E Aasheim
K H Solli

POLAND
L Muszyfiski
P Olejniczak

C J Johanson
B Källsner
J König
S Ohlson
H Peterson
S Thelandersson

SWEDEN
L Boström
J Brundin
P J Gustafson
T Isaksson

SWITZERLAND
E Gehri
A U Meierhofer

UK
T D G Canisius
V Enjily
A R Fewell
H D Mansfield-Williams
R F Marsh
C J Mettem
J Sunley

USA
J D Dolan
R Gupta

MEETING 29

AUSTRALIA
R Leicester

AUSTRIA
G Schickhofer

CANADA
E Karacabeyli
F Lam
H G L Prion
I Smith

CZECH REPUBLIC
P Kuklik

DENMARK
H J Larsen

FINLAND
J Kangas
T Poutanen
A Ranta-Maunus

FRANCE
L Daudeville
L Davenne
E Fourneley
P Galimard
P Morlier
P Racher
F Router

GERMANY
H J Blass
N Burger
J Ehlbeck
R Görlacher

JAPAN
M Yasumura

NETHERLANDS
A D Leijten

NORWAY
K H Solli

POLAND
B Szyperska

SWEDEN
C J Johansson
B Källsner
J König

SWITZERLAND
E Gehri
A U Meierhofer

UK
R J Bainbridge
T D G Canisius
D R Griffiths
C NETHERLANDS
J Marcroft
C J Mettem
R Marsh
A P Reffold
L R J Whale

USA
B Weeks
S Zylkowski

MEETING 30

AUSTRALIA
P Clancy
R H Leicester

AUSTRIA
G Schickhofer

BELGIUM
J Rathé

CANADA
R D Barrett Ming He
E Karacabeyli
F Lam
W Lau
B Madsen
H G L Prion

CZECH REPUBL
P Kuklik

DENMARK
H J Larsen
L Mortensen

ESTONIA
K P Oiger

FINLAND
J Kangas

FRANCE
L Daudeville
L Davenne
F Rouger
A Vergne

GERMANY
S Aicher
H J Blass
N Burger
G Dill-Langer
J Ehlbeck
R Görlacher

ITALY
A Cecotti

JAPAN
N Kawai
K Komatsu
M Yasumura

NETHERLANDS
A Jorissen
A D Leijten
C E Pollington

NEW ZEALAND
A Buchanan

NORWAY
Aasheim

SWEDEN
L Boström
J Brundin
T I Isaksson
B Källsner
J König
S Thelandersson

SWITZERLAND
E Gehri
A U Meierhofer
A Mischler

UK
J Bainbridg
Marsh
C J Mettem
T Reynolds

USA
T Williamson

MEETING 31

AUSTRALIA
G N Boughton
R W Chelberg
K Crews
A Horrigan
R H Leicester

AUSTRIA
B Obermayr
G Schickhofer

BELGIUM
J Rathé

CANADA
H G L Prion

DENMARK
L Damkilde
H J Larsen

FINLAND
H Boren
M Kairi
J Kangas
A Kevaninmäki
T Poutanen
A Ranta-Maunus
U Saarelainen

FRANCE
L Daudeville
F Rougér

GERMANY
P Becker
H J Blass
J Ehlbeck
R Gör1acher
M Schmid

JAPAN
N Kawai
K Komatsu
M Yasumura

NETHERLAND"
A Jorissen
A D Leijten

POLAND
B Szyperska

SWEDEN
L Boström
M Hansson
T Isaksson
B Källsner
J König
H Petersson
S Thelandersson

SWITZERLAND
A Mischler

UK
T D G Canisius
V Enjily
R Marsh
C J Mettem
M Milner
T Reynolds

USA
J D Dolan

MEETING 32

AUSTRIA
M Augustin
K Frühwald
B Hasewend
B Obermayr
G Oswald
R Pischl
G Schickhofer
A Trummer
M Wanner

CAMEROON
C Nguedjio Fouepe

CANADA
E Karacabeyli
F Lam
P Quenneville

DENMARK
C O Clorius
H J Larsen
J Nielsen
M U Pedersen

FINLAND
A Ranta-Maunus
J Vesa

FRANCE
P Racher
F Rouger

GERMANY
P Becker
A Bernasconi
H J Blass
J Ehlbeck
R Görlacher
V Krämer
B Laskewitz
B Mohr
K Rautenstrauch
M Schmid
T Wolf

ITALY
M Ballerina
A Ceccotti

JAPAN
N Kawai
K Komatsu
M Yasumura

NETHERLANDS
A Jorissen
A D Leijten

SWEDEN
S Andreasson
T Isaksson
B Källsner
J König
L Stehn
S Svensson
S Thelandersson

SWITZERLA ND
A Mischler
V Schrepfer

UK
M P Ansell
R Bainbridge
T D G Canisius
V Enjily
R Grantham
C J Mettem
T Reynolds

USA
P Manikins
B Yeh

MEETING 33

CANADA
E Karacabeyli
F Lam

CZECH REPUBLIK
P Kuklik

DENMARK
P Ellegaard
H J Larsen
J Nielsen

FINLAND
M Kairi
J Kangas
A Ranta-Maunus

FRANCE
J P Biger
T Lamadon
P Racher
F Rouger

GERMANY
H J Blass
J Ehlbeck
R Görlacher
V Kramer
B Laskewitz
K Rautenstrauch

ISRAEL
U Korin

ITALY
A Ceccotti
M Ballerina

JAPAN
N Kawai
M Yasumura

NETHERLANDS
J Janssen
A Jorissen
J Kuipers
A D Leijten
J W van de Kuilen
L A G Wagemans

POLAND
B Szyperska

SWEDEN
C Bengtsson
H Johansson
B Källsner
J König
L Stehn
S Svensson
S Thelandersson

UK
M P Ansell
R Bainbridge
R F Marsh
C J Metter

USA
B Yeh

MEETING 34

AUSTRIA
K Frühwald
G Schickhofer

BULGARIA
I Totev

CANADA
F Lam
I Smith

CZECH REPUBLI
P Kuklik

DENMARK
P Ellegaard
H J Larsen
J Nielsen

FINLAND
M Kairi
J Kangas
J Leskela

FRANCE
J P Biger
L Daudeville
T Lamadon
P Racher
F Rouger

GERMANY
P Becker
A Bernasconi
H J Blass
J Ehlbeck
P Glos
R Görlacher
M Grosse
P Haller
V Krämer
H Kreuzinger
K Rautenstrauch
M Romani

ITALY
M Ballerina
A Ceccotti

JAPAN
S Nakajima
M Yasumura

THE NETHERLANDS
W Bakens
A Jorissen

NORWAY
K Solli

SLOVENIA
B Dujic

SWEDEN
C Bengtson
M Hanson
T Isaksson
J Jönsson
B Källsner
J König
S Ohlsson
S Thelandersson

SWITZERLAND
A Mischler

UK
R Bainbridge
R F Marsh
V Enjily

USA
B Yeh

MEETING 35

CANADA
P Quenneville

DENMARK
P Ellegaard
H J Larsen
S Svensson

FINLAND
A Kevarinmäki

FRANCE
E Fournely
F Rouger

GERMANY
S Aicher
H J Blass
J Ehlbeck
R Görlacher
P Haller
L Höfflin
K Rautenstrauch
K U Schober

JAPAN
J Jensen
N Kawai
A Kitamosi
K Komatsu
S Nakajima
M Noguchi
T Sasaki
H Sugiyama
M Yasumura

LATVIA
B Ozola

NORWAY
E Aasheim
I Weider

SLOVENIA
B Dujic

SWEDEN
C Bengtson
M Hanson
B Källsner
J König
S Thelandersson

THE NETHERLANDS
G Gonzalez
A D Leijten

UK
B S Choo
R F Marsh

USA
R Gutkowski
B Yeh

MEETING 36

AUSTRALIA
B Leicester

CANADA
F Lam
I Smith

DENMARK
P Ellegaard
H J Larsen

FINLAND
A Ranta-Maunus

FRANCE
J P Biger

GERMANY
H J Blass
J Denzler
R Görlacher
L Höfflin
S Lehmann
K U Schober

ITALY
A Ceccotti
M Ballerini

JAPAN
J Jensen
N Kawai
K Komatsu
S Nakajima
M Yasumura

LATVIA
L Ozola

NEW ZEALAND
H Bier

PORTUGAL
L F C Jorge

SLOVENIA
B Dujic
R Zarnic

SWEDEN
C Bengtson
M Hanson
H Johnson
R Kliger

SWITZERLAND
J Köhler

THE NETHERLANDS
A Dias
A Jorissen
A D Leijten

UK
B S Choo
D Ridley-Ellis

USA
D M Carradine
J D Dolan
R Gutkowski
B Kasal
B Yeh

MEETING 37

CANADA
A Asiz
Y H Chui
F Lam
E Karacabeyli
G Lehoux
P Quennville

DENMARK
C Clorius
H J Larsen
J Munch-Andersen

FINLAND
M Kairi
A Kevarinmäki

FRANCE
F Rouger

GERMANY
H J Blass
J Denzler
J Ehlbeck
P Fellmoser
S Franke
P Glos
R Görlacher
M Grosse
P Hamm
K Rautenstrauch

IRELAND
A Harte

ITALY
M Ballerina
A Ceccotti

JAPAN
K Komatsu
M Noguchi
M Yasumura

NORWAY
K Solli

SLOVENIA
B Dujic

SWEDEN
H Johnsson
B Källander
B Källsner
J König
E Lukaszewska

SWITZERLAND
A Frangi
J Köhler
R Steiger

THE NETHERLANDS
A Jorissen
J W van der Kuilen

UK
M Ansell
F Bradley
A Bahadori Jahromi
F Bruechert
A Lawrence
A Kerman
A Page
J Porteous
D Ridley-Ellis
Y Robert P Ross
V Tens
B Zhang J Zang

USA
D M Carradine
B Yeh
T Williamson

MEETING 38

AUSTRALIA
B Leicester

AUSTRIA
G Schickhofer

CANADA
A Asiz
F Lam
Chun Ni
E Karacabeyli
M Popovski
P Quenneville

CZECH REPUBLJC
P Kuklik

CROATIA
V Rajcic

DENMARK
H J Larsen

FINLAND
A Kevarinmäki
J Leskeld
A Ranta-Maunus

GERMANY
I Bejtka
H J Blass
H Brüninghoff
J Denzler
J Ehlbeck
P Fellmoser
M Frese
P Glos
R Görlacher
P Haller
R Hartnack
V Krämer
K Rautenstrauch
W Rug
M Schmid
T Uibel
H Werner

ITALY
M Ballerina
M Follesa
M P Lauriola
M Moschi
M Rizzi
A Ceccotti

JAPAN
M Yasumura

LATVIA
L Ozola

NEW ZEALAND
A Buchanan

SLOVENIA
B Dujic

SWEDEN
J Måsson
B Källsner
J König
S Thelandersson

SWITZERLAND
M Arnold
C Erchinger
A Frangi
J Köhler
V Schleifer
R Steiger

THE NETHERLADS
A Jorissen
J W van der Kuilen
A Leijten

UK
B Griffiths
A Kermani
A Lawrence
T Reichert

USA
B Yeh

MEETING 39

AUSTRALIA
K Crews

AUSTRIA
M Augustin
T Bogensperger
A Jöbstel
R Katzengruber
G Schickhofer

CANADA
A Asiz
E Karacabeyli
F Lam
P Quenneville
I Smith

CZECH REPUBLIC
P Kuklik

DENMARK
H J Larsen
H Riberholt

FINLAND
A Hanhijärvi
A Ranta-Maunus

FRANCE
P Racher

GERMANY
I Bejtka
H J Blass
J Denzler
M Deublein
A Döhrer
J Ehlbeck
B Franke
S Franke M Frese
R G6rlacher
A Heiduschke
K Rautenstrauch
J Schänzlin
T Uibel

IRELAND
A Harte,

ITALY
A Ceccotti
M Follesa
M P Lauriola
M Moschi
A Palermo
C Sandhaas
M Togni
L Uzielli

JAPAN
C Minowa
M Yasumura

SLOVENIA
B Dujic

SWEDEN
B Källsner
J König

SWITZERLAND
A Frangi
R Steiger

THE NETHERLAVDS
A Jorissen
A Leijten
J W van de Kuilen

NEW ZEALAN)
A Buchanan
M Fragiacomo

UK
V Enjily
R Marsh
D Trujillo

USA
T Williamson
B Yeh

MEETING 40

AUSTRALIA
K Crews
P Paevere

AUSTRIA
T Bogensperger
R Brandner
A Jöbstl
G Schickhofer

CANADA
Chun Ni
E Karacabeyli
F Lam
G Lehoux
M Popovski
A Salenikovich
I Smith

CROATIA
V Rajcic

DENMARK
H J Larsen

FINLAND
A Hanhijärvi
A Ranta-Maunus

FRANCE
L Blaskovic
C Faye
F Rouger

GERMANY
H J Blass
J Denzler
M Frese
R Görlacher
A Heiduschke
U Kuhlmann
P Linsenmann.
K Rautenstrauch
J Schänzlin
T Uibel

IRELAND
A Harte

ITALY
M Ballerina
A Ceccotti
M Fragiacomo

JAPAN
K Komatsu
M Yasumura

NEW ZEALAN)
P Quenneville

SLOVENIA
B Dujic
J Srpcic
R Zarnic

SWEDEN
C Bengtsson
U A Girhammar
J König
S Thelandersson

SWITZERLAND
E Gehri
A Frangi
M Deublem
J Köhler
R Steiger

THE NETHERLANDS
A Jorissen
A J M Leijten
J W van de Kuilen
P de Vries

UK
A Kermani

USA
T Williamson
B Yeh

MEETING 41

AUSTRIA
R Brandner
A Jöbstl
U Hübner

CANADA
A Asiz
M Bartlett
Ying H. Chuff
M Gong
G Gupta
F Lam
W Munoz M Noory
A Salenikovich
I Smith

CROATIA
V Rajcic

DENMARK
H J Larsen
J Munch-Andersen

FINLAND
A Kevarinmäki
A Ranta-Maunus

FRANCE
C Faye

GERMANY
S Aicher
H J Blass
J Denzler
M Frese
R Görlacher
U Kuhlmann
P Schädle
K U Schober
P Stapel
S Winter

ITALY
A Ceccotti
M Fragiacomo
A Polastri

JAPAN
K Komatsu

NEW ZEALAND
A Buchanan
J Jensen

SLOVENIA
B Dujic

SWEDEN
C Bengtson
J König
B Källsner
H Danielson

SWITZERLAND
M Sandomeer
J Köhler
R Steiger

THE NETHERLANDS
A Jorissen
A J M Leijten

USA
M Snow
T Williamson
B Yeh

MEETING 42

AUSTRALIA
K Crews

AUSTRIA
J K Denzler
H Krenn
G Pirnbacher
G Schickhofer

CANADA
F Lam
Chun Ni
M Popovski
I Smith

DENMARK
H J Larsen
J Munch-Andersen

FINLAND
A Ranta-Maunus
T Poutanen

GERMANY
S Aicher
P Aldi
H J Blass
P Dietsch
M Frese
G Gebhardt

GERMANY (cont.)
R Görlacher
U Kuhlmann
J W van de Kuilen
P Mestek
W Meyn
S Schmid
M Sieder
S Winter
H Zeitter

ITALY
A Ceccotti
M Fragiacomo

JAPAN
I Yasumura

THE NETHERLANDS
A Jorissen
C Sandhaas

NEW ZEALAND
A Buchanan
D Carradine
J Jensen
P Quenneville

SLOVENIA
B Dujic

SWEDEN
C Bengtsson
R Crocetti
U A Girhammar
K Karlsson
B Källsner
J König
J Schmid
G Tlustochowicz

SWITZERLAND
G Fink
A Frangi
E Gehri
S Gerber
R Jockwer
M Klippel
J Köhler
M Sandomeer
C Sigrist
R Steiger
T Tannert
M Theiler
R Widmann

USA
T Williamson
B Yeh

MEETING 43

AUSTRALIA
K Crews
L Daziel
C Gerber
T Gibney
R Nestic

DENMARK
H J Larsen
J Munch-Andersen

FINLAND
T Poutanen

FRANCE
C Faye
F Rouger

GERMANY
S Aicher
H J Blass
M Frese
R Görlacher
P Schädle
P Stapel
T Uibel
S Winter

ITALY
A Ceccotti
M Fragiacomo

JAPAN
M Yasumura

NEW ZEALAND
M Ardalany
W Banks
G Beattie
H Morris
P Moss
J O'Neill
A Palermo
P Quenneville
C Rodger
F Scheibmair
W Van Beerschoten
A Buchanan
D Carradine
M Cusiel
B Franke
S Franke
S Giorgini
M Jamil
J Jensen
B Walford
P Zarnami

SWEDEN
R Crocetti
J Schmid

SWITZERLAND
T Tannert

THE NETHERLANDS
A Jorissen

UNITED KINGDOM
R Harris

USA
T Skaggs
B Yeh