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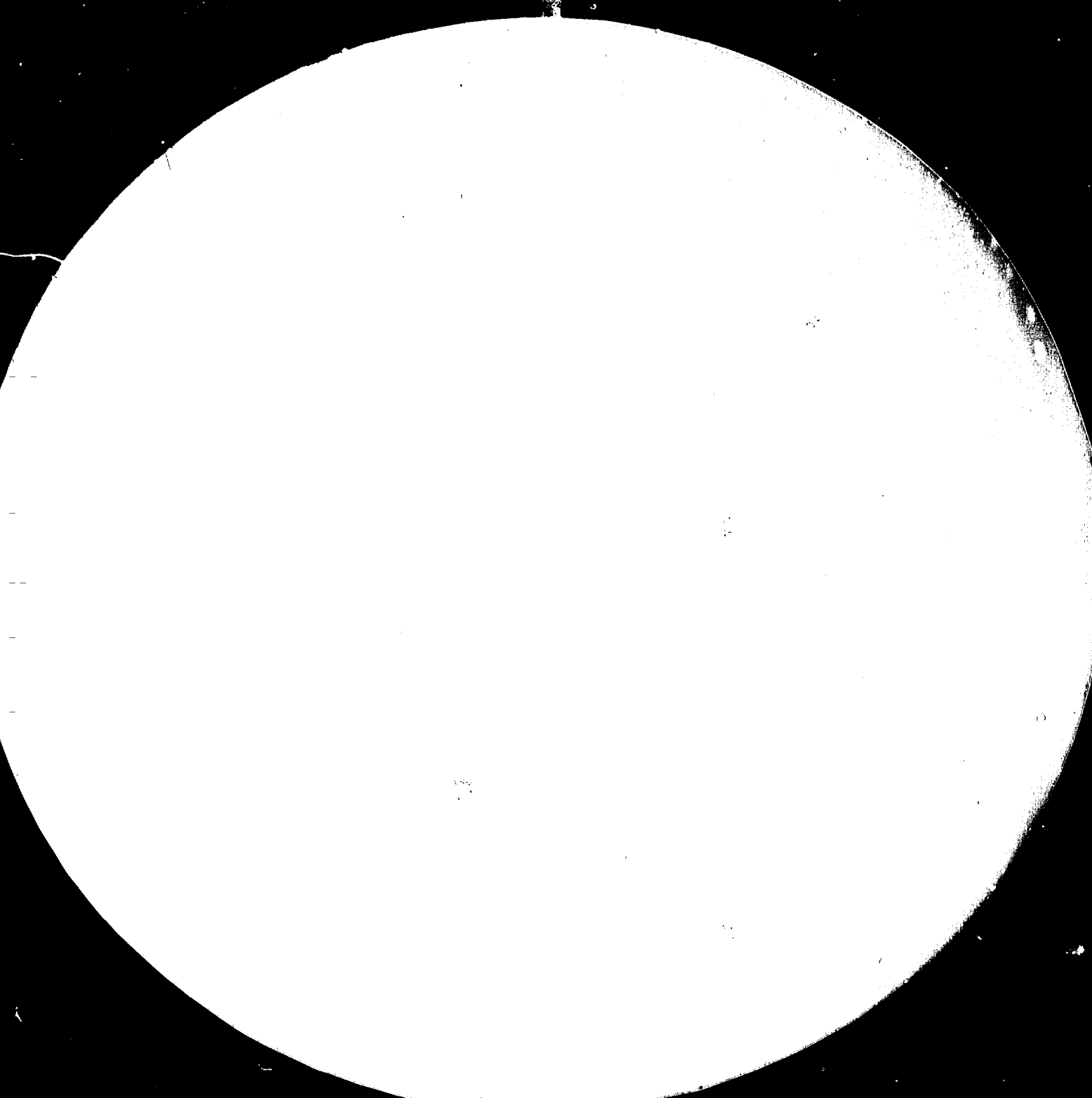
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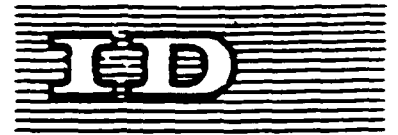


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United Nations Industrial Development Organization

ENGLISH

Workshop on Cement and Concrete Products

Brisbane, Australia, 18-29 May 1981

REPORT

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INTRODUCTION

1. Following the success of the workshop on negotiating techniques for transfer of technology agreements held in Sydney in March 1979 under the co-sponsorship of the United Nations Industrial Development Organization (UNIDO) and the Government of Australia, the Australian authorities began exploring the possibility of co-operating with UNIDO on another, similar, workshop.
2. Several topics were considered, but after informal consultations with UNIDO, the Economic and Social Council for Asia and the Pacific (ESCAP) and the Australian cement industry, it was decided that a workshop on cement and concrete products would have the most interesting potential, particularly as Portland cement, one of the most versatile of building materials, was seen to be essential to the promotion of industrial development.
3. The cement industry is capital-intensive, whereas the product itself - cement - is energy-intensive. However, the installation costs of cement plants and the production costs of cement are continuously increasing. It was therefore considered important to identify areas where savings could be made, both in production and consumption.
4. Experience has proven that the use of (a) increased knowledge in the testing and evaluation of cement, steel, aggregates and admixtures, (b) improved technology in mixing, handling and casting, and (c) more efficient transport and storage will lead to considerable savings in cement consumption.
5. It is also known that the production and use of good-quality prefabricated and/or pre-stressed concrete linear and masonry products - including beams, lighting and power transmission poles, piers for houses, railway sleepers, and concrete and asbestos-cement pipes - will increase the potential of the construction sector and simultaneously reduce the amount of cement wasted on construction sites.
6. The Australian cement industry has been in the forefront of technology in this field. Australian companies have developed, imported or modified many of the technological skills, processes and equipment essential to the development of the concrete products industry, and they have accomplished this in conditions similar to those prevailing in many developing countries. Indeed, there is already a degree of co-operation in this field between Australia and developing countries in the Asia/Pacific region - however, there is scope for this to be expanded and strengthened.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

7. The following conclusions were adopted by the workshop:

(a) The objectives of the workshop were well chosen and were of importance to the countries in the region.

(b) Through the concerted efforts of the organizers and the participants, the objectives of the workshop were achieved.

Recommendations

8. The following recommendations were adopted by the workshop:

(a) National Governments in developing countries are urged to develop policies that aim at:

Making optimum use of local raw materials;

Co-ordinating developments in the cement and concrete products field with those in the construction industry;

Avoiding the introduction of impractical technology;

Seeking guidance from bodies such as UNIDO which have access to regional experts.

(b) UNIDO is urged to continue to:

Co-ordinate activity in the cement and concrete products industry with work in construction etc.;

Sponsor workshops in this and the related building and construction industries;

Develop its register of industry experts and provide this facility for developing countries;

Promote debate aimed at encouraging industrial development, particularly through the sponsorship of workshops.

(c) The Australian cement industry is urged to:

Continue its assistance in developing the industry in the region;

Provide expert consultants and consulting firms when required in developing countries.

(d) All parties concerned are urged to:

Liaise in overcoming the lack of training and management skills that currently exist in the cement and concrete industries in the developing countries.

9. The participants expressed their sincere appreciation to the host Government and to all those involved in the organization of the workshop.

I. ORGANIZATION OF THE WORKSHOP

Opening of the workshop

10. The workshop on Cement and Concrete Products was officially opened in Brisbane on 18 May 1981 by Mr. John Moore, Minister for Business and Consumer Affairs, who welcomed the participants on behalf of the Australian Government and encouraged them to participate in the workshop and to learn from the Australian experience in the cement and concrete products field.

In his address of welcome, the minister stated that the Australian Government placed considerable emphasis on inviting people from developing countries in the region to study developments in various industrial sectors. Australia, he said, could play a particularly important role in assisting the development of technical expertise within the area.

11. The Minister pointed out that Australia held much in common with the developing countries represented in the workshop:

"We have a growth and development path which necessarily involves many similar experiences to countries participating in this workshop which can perhaps be usefully shared."

12. The Minister also pointed out that the Brisbane workshop, like the two that had preceded it, had been organized in an area where Australia believed it could make a significant and appropriate contribution to the industrialization efforts of the developing countries of the region. He further noted that the topic was highly relevant, the cement and concrete products industry being basic to the development of all countries.

13. In conclusion, the Minister exhorted the participants to make the best use of the opportunity provided, to take note of developments in the cement industry in Australia, and to strive to adapt the techniques and processes observed in developing the industry in their own countries.

Message from Executive Director of UNIDO

14. The following are excerpts from a message delivered by a Senior Industrial Development Officer of UNIDO on behalf of the Executive Director, Dr. Abd-El Rahman Khane, who had been unable to attend the workshop as it coincided with the fifteenth session of the Industrial Development Board, the policy-making organ of UNIDO.

15. "This workshop is of interest to the construction industry in the developing countries - an industry given particular priority in the industrialization framework of those countries.
16. "Beyond the necessity of providing shelter, the construction industry holds particular advantages for the developing countries. It encourages the utilization of local raw materials. It also serves as a catalyst for the development of other industrial sectors, such as engineering and electrical.... The labour-intensive nature of certain of its processes ... is of considerable importance in countries where the unemployment rate is particularly high.
17. "Another theme currently being given priority in international circles, and which relates to this workshop, is the development of human resources. At the Third General Conference of UNIDO (New Delhi, 21 January - 9 February 1980) there was a clear recognition that the accelerated industrialization of the developing countries would require considerable investment in industrial training at all levels, from management to factory floor. Projects such as this workshop clearly indicate the direction for such a training effort. The workshop will allow participants to benefit not only from the experience acquired by the host country, Australia, in this industrial sector, but also from the experience of other countries, within the third world.
18. "This leads me to the third and final aspect of the workshop, which I feel should be underlined, namely the concept of regional co-operation. Participants of this workshop are drawn in the main from countries within the South-East Asia region. This region has already indicated its interest in meaningful co-operative ventures on a regional basis. The formation of ASEAN^{1/} is clearly witness to this interest. It is my hope that this workshop will serve to create greater understanding between countries in the region of the problems confronting the cement and concrete industries, and that through that understanding closer industrial links will be forged."

Statement by representative of Department of Industry and Commerce

19. The Government of Australia was represented at the workshop by Mr. A.F. Caddy of the Department of Industry and Commerce, who explained that the primary role of his Department was to provide advice on Government policy relating to the development of Australian manufacturing and tertiary industries, including shipbuilding, the tourist industry and small business.

^{1/} Association of South-East Asian Nations.

20. The Department was therefore heavily engaged in the formulation of policies that would encourage the economic development of those industries, within the framework of the Government's national economic and social policies.

21. With respect to the workshop, Mr. Caddy pointed out that the objective was not merely to impress participants with the Australian cement industry; however, participants should study the Australian experience to see how it could be applied in their own countries. For that reason, the workshop involved both lectures and site visits. In addition, time had been built into the programme for discussions on the topics touched on by speakers.

22. Mr. Caddy urged all participants to ask questions and enter into the discussions: a great store of information was available which could serve as a basis for decision-making in choosing appropriate technologies.

23. "A key element is adaptability", concluded Mr. Caddy. "Participants should, we believe, aim at identifying technologies that:

Are capable of meshing in with current practices and processes in the existing cement and concrete products industry;

Can be incorporated into the domestic construction industry;

Will result in the maximum use of domestic raw materials and resources;

Are of scale, both in relation to capital investment and product market requirements."

Election of officers

24. The following participants were elected officers of the workshop:

Chairman	A. F. Caddy Department of Industry and Commerce Australia
Vice Chairman	Aung San General Manager Ceramics Industries Corporation Rangoon, Burma
Vice Chairman	Ahmed Jamiluddin Director Bangladesh Mineral Exploration and Development Corporation Dacca, Bangladesh
Rapporteur	L. Ffrench Department of Industry and Commerce Australia

Co-rapporteur

Bintaldjemur
Director
Head, Sub-Directorate General
Basic Chemical Industry
Indonesia

Co-rapporteur

Mohammed Jamil
Engineer
Malaysian Industrial Development Authority
Malaysia

II. PURPOSE AND ACHIEVEMENTS OF THE WORKSHOP

25. The purpose of the workshop was to review and evaluate the various technologies in the industry, taking into account comparative advantage, appropriateness, costs and infrastructure requirements. The workshop also aimed at developing an appreciation of associated technical areas, such as codes and standards. Above all, the workshop sought to promote an exchange of experience between Australian participants and those from developing countries as well as among the developing country participants themselves.
26. The workshop provided participants with detailed information regarding:
- (a) Production and raw materials; testing and evaluation of cement, steel, aggregates, admixtures etc.; mixing, handling and casting; transport and storage; problems (e.g. corrosion), problem solving etc.;
 - (b) Concrete and asbestos cement pipes;
 - (c) Structural, linear and masonry products, including beams, lighting and power transmission poles, pre-cast products, pre-stressed and reinforced products, masonry products, piers for houses, and railway sleepers.
27. The workshop examined the need for preparatory work on the planning of new plants; the utilization and testing of basic materials; concrete technology; transport and storage; corrosion; quality control; and the production of concrete products, e.g. pipes, structural, linear and masonry products.
28. Participants from selected developing countries presented monographs on the status and development of the cement and concrete products industry in their countries.
29. Workshop activity included study tours to a number of appropriately sized cement and concrete products plants in the Brisbane area, which provided participants with an insight into the application of technologies under conditions similar to those found in developing countries.

Annex I

LIST OF PARTICIPANTS AND OBSERVERS

Participants

Australia

Ian Adams, Pipes Section Manager, James Hardie Pty Ltd., Meeandah
Roger Bacon, Chief Engineer, Besser (Qld) Ltd., Darra
Peter Bainbridge, Civil Engineer, Rocla Concrete Pipes, Melbourne
Ray Bange, Head, Civil Engineering, Department of Engineering, Queensland Institute of Technology, Brisbane
David Beal, Lecturer, Queensland Institute of Technology, Brisbane
David William Bywater, Bridge Engineer, Queensland Government Railways, Brisbane
Hugh Stewart Cameron, President, Cement and Concrete Association of Australia, General Manager and Director, Queensland Cement and Lime Co. Ltd., Darra
Kevin D. Campbell, Regional Engineer for Victoria Cement and Concrete Association, South Melbourne
Paul Casey, State Manager, Pioneer Concrete (Qld) Pty Ltd., Toowong
Stan Cottle, Field Service Officer, James Hardie Pty Ltd., Meeandah
Peter Cummings, Vice-President, Concrete Masonry Association, Darra
John Davies, Design and Project Manager for Queensland Civil and Civic Pty Ltd., Brisbane
Richard Dixon, District Engineer, Port Augusta, Australian National Railways, Adelaide
Raymond Duggan, Gladstone Area Manager, Pioneer Concrete (Qld) Pty Ltd., Toowong
Keith Duncan, James Hardie Pty Ltd., Meeandah
Graham Dytor, General Manager, Boral/Besser Masonry Ltd., Seven Hills, New South Wales
John Fenwick, Site Engineer, Special Projects Section, Department of Queensland Main Roads, Spring Hill
Terry Hammond, Building Products Factory Manager, James Hardie Pty Ltd., Meeandah
Neville Hatten, Technical Services Manager, Humes Limited, Melbourne
Des Hoens, Sales Manager, Building Products, James Hardie Pty Ltd., Carole Park
Graham Holmes, Divisional Civil Engineer, Monier Ltd., Chatswood
Barbara Hughes, Industrial Development Officer, Department of Commercial and Industrial Development, Brisbane

Peter Stuart McAdam, Lecturer, Department of Building and Quantity Surveying, Queensland Institute of Technology, Brisbane

John Meek, Reader in Civil Engineering, University of Queensland, St. Lucia

Wolf Merretz, Senior Structural Engineer, EPM Concrete Pty Ltd., Blacktown

Paul Morrish, Chief, Information Division, Cement and Concrete Association of Australia, North Sydney

John Mulheron, Deputy Director (Technical), Co-ordinator-General's Department, Brisbane

David Newbegin, Manager, Concrete Section, Technisearch Limited, Collingwood

Ian Orchard, Regional Engineer, Cement and Concrete Association of Australia, Brisbane

Graham Pash, Managing Director, VSL Prestressing (Aust) Pty Ltd., Thornleigh

Ian Patterson, Reinforcement Manager, ARC Engineering Pty Ltd., Brisbane

John Peak, Civil Engineer, Pozzolanic (Qld) Pty Ltd., South Brisbane

Bob Potter, Senior Development Engineer, Cement and Concrete Association of Australia, North Sydney

Douglas Rea, Managing Director, Doug Rea Enterprises Pty Ltd., Ipswich

Maxwell John Ryan, Secretary, Concrete Pipe Association of Australia, Victoria

Ray Sadler, Australian Institute of Management, Spring Hill

Trevor Schaefer, Manager, Meales Pumping Service, President of Queensland Concrete Pumping Association, Robertson

Laurie Schneider, Experimental Building Station, Department of Housing and Construction, North Ryde

Charles William Simpson, Assistant Chief Engineer, Rocla Industries Ltd., Melbourne

Brian Stevens, General Manager, EPM Concrete Pty Ltd., Blacktown

Laurence Kerrod Toppenberg, Chief Engineer (International), Pozzolanic (Qld) Pty Ltd., South Brisbane

Dean F. Trowse, Regional General Manager (Qld), The Readymix Group Ltd., Brisbane

Geoffrey C. Verge, Chairman, Precast Concrete Practice Committee of Concrete Institute of Australia, North Sydney

John Whitaker, Director and State Manager, James Hardie Pty Ltd., Meeandah

Evan R. White, President, Concrete Masonry Association of Australia, Darra

John Wintraaken, Tile Manager, Monier Ltd., Darra

Bangladesh

Jamiluddin Ahmad, Director (op), Bangladesh Mineral Exploration and Development Corporation, Dacca

Burma

Aung San, General Manager, Ceramics Industries Corporation, Rangoon
Thaung, General Manager, Ceramics Industries Corporation, Rangoon

China

Li Jing-King, Directory of Department, Engineer, Technical Information and Standards Zotren, Research Institute of Building Materials, Ministry of Building Materials Industry, Beijing

Zheng Zhi-Hua, Engineer, North-Eastern Architectural Design Institute, Shenyang

Indonesia

Bintaldjemur Danuhadiningrat, Head of Sub-Directorate Inorganic Chemicals, Directorate General of Basic Chemical Industry, Jakarta

Nadhiroh Masruri, Head of Building Research, Building Research Institute, Bandung

Malaysia

Mohd. Jamil Z. Abidin, Engineer, Malaysian Industrial Development Authority, Kuala Lumpur

Nepal

Prabhat Kiran Sundar Pradhan, Senior Resident Engineer, National Construction Company Nepal Ltd., Kathmandu

Chakra Dass Rajbhandari, Senior Chief of Production, Imal Cement Company, Kathmandu

Papua New Guinea

Henry Rumints, Production Manager, Monier (PNG) Ltd., Port Moresby

Philippines

Roberto V. Reyes, President, Hi Cement Corporation, Metro Manila

Domingo D. Viray, Vice President, Hi Cement Corporation, Metro Manila

Sri Lanka

T. G. A. Premadasa, Works Manager, Sri Lanka Cement Corporation, Ruhunu Cement Works, Galle

Syrian Arab Republic

Awwad Farouk, Adviser, General Organization for Cement in Syria, Damascus

Turkey

Turhan Erdogan, Head, Materials of Construction Division, Department of Civil Engineering, Middle East Technical University, Ankara

Observers

Australia

A. F. Caddy, Assistant Secretary, International Branch, Department of Industry and Commerce, Barton A.C.T.

A. Caine, Project Officer, Multilateral Affairs Section, Department of Industry and Commerce, Barton A.C.T.

L. Ffrench, Assistant Director, Multilateral Affairs Section, Department of Industry and Commerce, Barton A.C.T.

N. Smith, Regional Director, Department of Industry and Commerce, Commonwealth Government Centre, Brisbane

Annex II

LIST OF DOCUMENTS

Discussion papers

UNIDO programmes and development in the field of building materials and construction - UNIDO Secretariat	ID/WG.347/1
Development of cement and concrete products industry, linkages and role in the overall economy - UNIDO Secretariat	ID/WG.347/2
Profile and history of the Australian industry	ID/WG.347/3
The development of the cement and concrete products industry in the State of Queensland (including an outline of Governmental assistance to industry and its relation to decentralization)	ID/WG.347/4
Concrete - materials, properties and practice	ID/WG.347/5
Gladstone fly ash for use in concrete	ID/WG.347/6
Steel reinforcing	ID/WG.347/7
Concrete admixtures - controversial or credible	ID/WG.347/8
Transport and storage of cement and other materials	ID/WG.347/9
The ready mixed concrete industry - an overview	ID/WG.347/10
Concrete ready mix industry - equipment and machinery	ID/WG.347/11
On-site mixing of concrete	ID/WG.347/12
Formwork and formwork systems in Australia	ID/WG.347/13
General introduction to precast concrete manufacturing techniques	ID/WG.347/14
Concrete in buildings - a review of current Australian practices	ID/WG.347/15
Precast concrete - recommended practice	ID/WG.347/16
On-site precast tilt-up construction	ID/WG.347/17
Post-tensioned building structures. Economic trends and the influence of construction time	ID/WG.347/18

Post-tension segmental bridges: Neville Hewitt Bridge - Albert St., Rockhampton	ID/WG.347/19
Post-tension segmental bridges: The Houghton Highway Viaduct across Bramble Bay	ID/WG.347/20
Post-tension segmental bridges: Some design aspects of a 215 metre span prestressed concrete box girder bridge	ID/WG.347/21
Problems in concrete products	ID/WG.347/22
Ferro-cement - applications - technology	ID/WG.347/23
Transfer of technology in the cement and concrete products field	ID/WG.347/24
Pipe industry in Australia: vertically cast pipes, pipe sizes and service conditions	ID/WG.347/25
Pipe manufacture, joints, pressure pipes, standards, testing	ID/WG.347/26
Quality of concrete used in pipe manufacture, impact of aggressive agents, plastiline pipes, flow characteristics, reinforcement	ID/WG.347/27
Asbestos cement pipes - products and applications	ID/WG.347/28
Asbestos cement pipe technology	ID/WG.347/29
General introduction to precast products wall cladding	ID/WG.347/30
Standard prestressed concrete bridge beams - Queensland Government Railways	ID/WG.347/31
Hollow spun reinforced concrete poles	ID/WG.347/32
Precast products - concrete railway and tramway sleepers, technology, manufacture and usage: review of current usage in Australia	ID/WG.347/33
Manufacture of prestressed concrete sleepers	ID/WG.347/34
Ten years of concrete sleepers on the Australian National Railways	ID/WG.347/35
Concrete masonry manufacture	ID/WG.347/36
Producing block with minimum capital - a personal experience	ID/WG.347/37

Country papers

Cement and concrete production in Indonesia	ID/WG.347/38
Precast concrete products in Papua and New Guinea	ID/WG.347/39
Cement industry in Bangladesh	ID/WG.347/40
Country monograph - Nepal	ID/WG.347/41
Country monograph - Nepal	ID/WG.347/42
The cement and allied products industry in Sri Lanka	ID/WG.347/43
Monograph: current status of the technology of the Philippine cement and concrete products industry	ID/WG.347/44
The general introduction of the cement and concrete products in China	ID/WG.347/45



