5th CECAR
ACECC TC-8
Special Forum on Harmonization of Design Codes in the Asian Region
(in Sydney, Australia)

Date : August, 11, 2010 Wednesday
Venue : Bayside 101, Sydney Convention and Exhibition Centre
Organized by ACECC TC-8
JSCE (Japan Society of Civil Engineers)

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Forum Schedule

(Moderator : Dr. Horikoshi, K., Secretary, ACECC TC-8)

Time table	Sessions	Speakers
11:00-11:05	**Greetings**	Dr. Kenji Sakata President of JSCE
11:05-11:20	**Opening Introduction** Introduction of the ACECC Activities on TC-8	Dr. Kenichi Horikoshi, Secretary, ACECC TC-8
11:20-12:45 (15-20min for each topic)	Recent Revision of Japanese Technical Standard for Port and Harbour Facilities (TSPHF) Based on a Performance Based Design Concept	Dr. Yoshiaki Kikuchi, Dr.Youichi Watabe Port & Airport Research Institute Dr. Tsuyoshi Nagao National Institute for Land and Infrastructure Management
	Necessity of Code Harmonization for the Developing Countries. Mongolia Case Studies.	Prof. Erdene Ganzorig, Mongolian University of Science and Technology Structural Engineering Department President of MACE
	Globalisation and the Harmonization of Design and Material Standards within the Asian Region – an Australian Perspective	Mr. Phil Blundy Councillor of Standards Australia, Chair of Structural College, EA
	A Treatise of Current Australian Steel and Steel-Concrete Composite Standards and Comparisons with Other International Standards	Prof. Brian Uy Head of School, School of Engineering & Director, Civionics Research Centre, University of Western Sydney
	Future Developments of the Eurocode 4	Prof. Dennis Lam Chair in Structural Engineering School of Engineering, Design & Technology University of Bradford, UK
12:45-13:00	**Closing Remarks**	Prof. Yusuke Honjo, Gifu University, Chair of ACECC TC-8, JSCE

Presentations

Recent Revision of Japanese Technical Standard for Port and Harbour Facilities (TSPHF) Based on a Performance Based Design Concept

Dr. Yoshiaki Kikuchi, Dr.Youichi Watabe
Port & Airport Research Institute
Dr. Tsuyoshi Nagao
National Institute for Land and Infrastructure Management

Recent Revision of Japanese Technical Standard for Port and Harbour Facilities (TSPHF) Based on a Performance Based Design Concept

The 5th Civil Engineering Conference in the Asian Region and
Australian Structural Engineering Conference 2010
Aug. 8-12, 2010
Sydney Convention and Exhibition Centre, Australia

Y. Kikuchi*, T. Nagao**, Y. Watabe*

*Port & Airport Research Institut
**National Institute for Land and Infrastructure Management

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3. Summary

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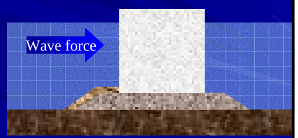
1. Difference of former and new TSPHF
2. Reliability based design method in new TSPHF
3. Summary

What is Breakwater?

Breakwaters are constructed to maintain the calmness of the basin and ease of handling of cargo at quay walls. To perform these aims, breakwater should be designed to be safe against strong wave forces and to cut the transmission of wave forces.

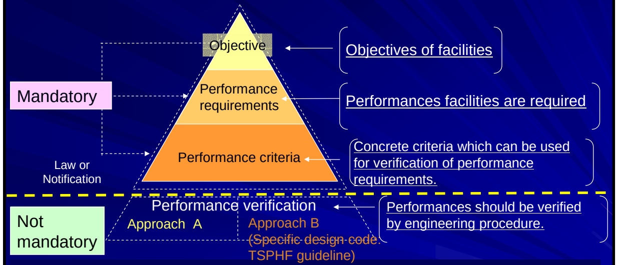


Example of provisions in former TSPHF

Breakwater or Protective facilities

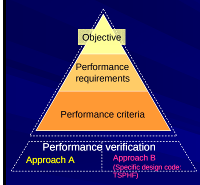
	Contents	Provisions in former TSPHF
Objectives and performance requirements	Function	Protective facilities for harbors should be maintained its function under every natural situations such as geography, meteorology, marine phenomena and others. (Law Article 7)
	Safety	Protective facilities should be safe against self weight, water pressure, wave force, earth pressure, earthquake force and so on. (Law Article 7)
Performance verification (They are also written in notification)	Calculation of forces	The wave force acting on a structure shall be determined using appropriate hydraulic model experiments or design methods in the following procedure. (Notification Article 5)
	Safety verification of members	Examination of the safety of the members of the rein forced concrete structures shall be conducted as standard by the limit state design method. (Notification Article 34)
	Stability check	Examination of the stability of upright section of gravity type breakwater shall be based on the design procedures using the safety factors against failures. (Notification Article 48)

Technical standard system under performance based design concept NEW TSPHF



- Performance verification: Designers can select the approach for verification.
  - Approach A: Designers should prove the verification of the performance requirements under a appropriate reliability. Verification results will be checked by an accredited organization or a authorized committee.
  - Approach B: Designers should prove the verification of the performance requirements in accordance with technical codes prepared by the authorities
    >> Guidelines which present the standard procedure of verification are prepared for reference.

Concept of performance based design system in New TSPHF



Level	Definition / contents of description	Mandatory situation
Objectives	The reason why the facility is needed.	Mandatory (Port and Harbor Law)
Performance requirements	Performances which facilities are required	Mandatory (Port and Harbor Law)
Performance criteria	Concrete criteria which represent performance requirements	Mandatory (Notification)
Performance verification	Performances should be verified by engineering procedure.	Not Mandatory (Guidelines are presented for references)

Performance considered in former TSPHF

For all the structures

Design situation	Definition	Performance Requirement
Ordinary Situation	Permanent actions (self weight, earth pressures) are major actions	Safety factors against failure shall be larger than prescribed value.
Extraordinary Situation	Variable actions (wave, Level 1 earthquake) are major actions	

The design situation only for earthquake proofed structures

Large earthquake	Level 2 earthquake is major action	Safety factors against failure shall be larger than prescribed value.

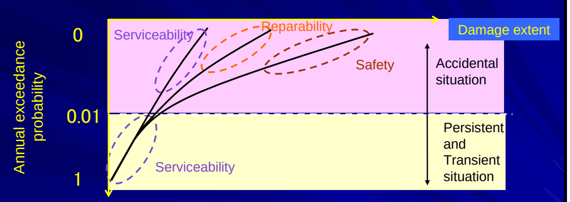
Level 1 & 2 earthquake

- For the verification of earthquake resistance of public structures, two types of seismic motions shall be applied such as Level1 earthquake and Level 2 earthquake.
  - Level 1 earthquake: is the intensity of seismic motion which structures will encounter 1 or 2 times during its service period. This level of earthquake is the almost equivalent seismic motion as that used for the external force against conventional seismic design. Return period of this earthquake is about 75 years.
  - Level 2 earthquake: is the intensity of seismic motion of which event probability is quite low. Large scale plate boundary earthquakes occurred near land or inland earthquakes will be this kind of earthquakes.

Performance matrix considered in New TSPHF

Design situation	Definition	Performance Requirement
Persistent Situation	Permanent actions (self weight, earth pressures) are major actions	Serviceability (Possibility of damage is low or the functions of the facility would be recovered with minor repairs.) ・Serviceability is required for all facilities ・Serviceability includes Reparability and Safety.
Transient Situation	Variable actions (wave, Level1 earthquake) are major actions	
Accidental Situation	Accidental actions (Tsunami, Level 2 earthquake) are major actions	・Levels of the performance requirements will be changed by the importance of the facilities. - Serviceability - Reparability: The function of the facility would be recovered in relatively short period after some repairs. - Safety: Significant damage would take place. However, the damage would not cause any lives loss or serious economic damages to hinterland.

Relation between design situation and performance requirement in New TSPHF

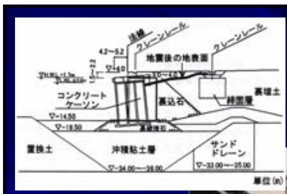


Note) Accidental and transient situation are separated by the annual exceedance probability of 0.01 for the descriptive purpose.

Design situation in Japan

Port and Harbor Bureau considers to construct earthquake proofed facilities for each mega port.
In this case, serviceability of the berth should be kept even after the attack of Level 2 earthquake which is an accidental action.
This kind of design situation should be considered in new TSPHF.

Kobe earthquake in 1995
L2 earthquake

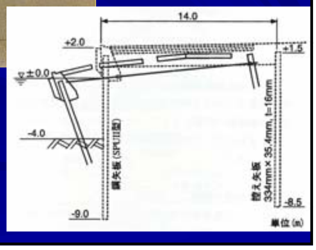


× Serviceability
× Reparability
○ Safety

Safety: Significant damage would take place. However, the damage would not cause any lives loss or serious economic damages to hinterland.

Hokkaido Nansei-oki Earthquake in 1993

Strong earthquake, but not L2 earthquake



× Serviceability
× Reparability
○ Safety

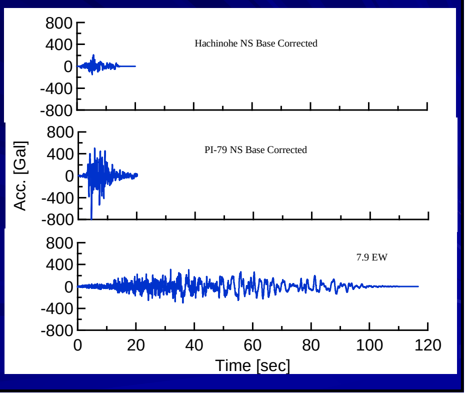
Structure should be stronger in designed with new TSPHF.

Seismic waves considered in design

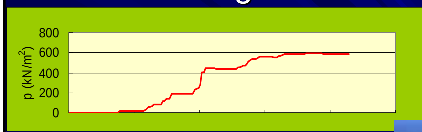
Hachinohe in 1968

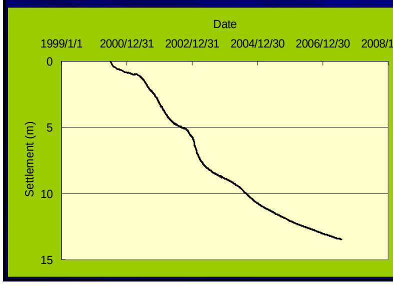
Kobe in 1995

Seismic wave for design of the new runway in Haneda Airport for L2 earthquake



Large settlement





Kansai International Airport
2nd phase

In some cases, this kind of large settlement should be considered in the design.

Advantage of new TSPHF

- Advantage of new TSPHF shall be summarized as follows;
  - Performance of facilities are clearly presented to users.
    - Fully performance based design code is introduced.
  - Designers can utilize their decision and can exercise their ingenuity.
    - They can propose new design method or new type of structures.
  - Building cost reduction is anticipated with ingenuity.
- In order to employ above advantages appropriately, it is required for designers and promoters to understand the thoughts and technical contents of the TSPHF correctly.
- And to guarantee to users that new technology has satisfied the demand of TSPHF, the system for checking the adequateness of proposed design to TSPHF is founded.

1. Difference of former and new TSPHF
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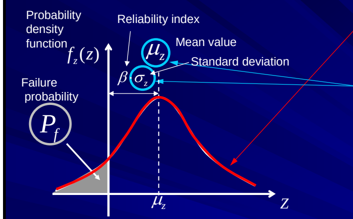
Performance based design in new TSPHF (in guideline)

- Not only static analysis such as seismic coefficient method but also dynamic response analysis is introduced especially in the case of important structures.
  - Performance of quay wall is indicated by displacement or deformation. To evaluate those, analytical method to predict the deformation of the structure is needed.
- Importance of model tests or field experiments are emphasized to include design verification procedure.
- Reliability based design (Partial factor method) is introduced for verifying the performance in persistent and transient situations
  - Performance levels are categorized mainly by importance of the structures.

Traditional safety factor method are still used for some types of structures. In those cases, partial factors are formally used.

Levels of Reliability based design method



(1) Level 3 RBD
- Failure probability is directly evaluated (P_f: Probability of performance function Z<0)

(2) Level 2 RBD
- Distance between mean value μ_z and failure condition is evaluated with reliability index β.
- Indirectly considering the probability distribution form. β and σ_z are considered for evaluating failure probability.

Performance function, Resistance, Action

$$Z = R - S$$

$$= (\gamma_R R_k - \gamma_S S_k)$$

Partial factor, Partial factor

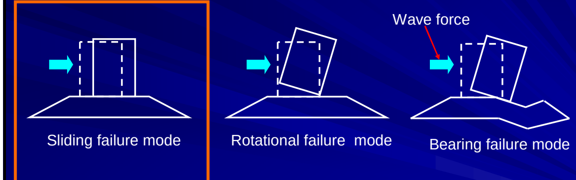
(3) Level 1 RBD
- Partial factors are used for considering the distance between mean value and failure condition.
- Partial factors are decided from Level 2 RBD calculation.

$$\gamma_i = \left(1 - \alpha_i \beta_T \frac{\sigma_i}{\mu_i}\right)\frac{\mu_i}{x_{ki}}$$

Design verification of gravity type of breakwater

Design verification method used in new TSPHF is explained using the verification of gravity type of breakwater for example.

Three modes of failures are considered.



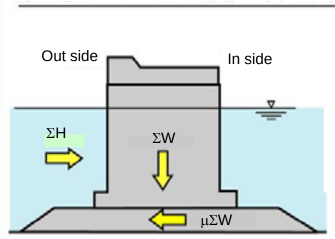
Verification of sliding mode of failure is presented.

Design situation is transient situation at which wave force is the major action.

Design verification of gravity type of breakwater

Traditional method

Forces acting on breakwater at sliding mode of failure



$$F_s = \frac{\mu \cdot \sum W}{\sum H}$$

F_s: Safety factor for sliding failure
ΣW: Total vertical force
ΣH: Total horizontal force
μ: coefficient of friction

Difference in statements between former and new TSPHF

(Ex: Verification of the sliding stability of a gravity type of breakwater)

Former TSPHF

$$F_s \le \frac{\mu \cdot (W_0 - U)}{P}$$

$F_s = 1.2$

F_s: Safety factor
μ : friction coefficient between the upright section and rubble mound
W_0: weight of the upright section in still water
U: uplift force
P: horizontal wave force

New TSPHF

$$\gamma_f f_k (\sum_i \gamma_{W_i} W_{ik} - P_{Bd} - \gamma_{P_U} P_{Uk}) \ge \gamma_{P_H} P_{Hk}$$

$P_f \le 8.7\times10^{-3}$

γ: partial factor
k (suffix): characteristic value ,
d (suffix): design value
f: friction coefficient between the upright section and rubble mound
W_i: total weight of the upright section
P_B: buoyancy acting on the upright section in still water
P_U: uplift force acting
P_H: horizontal wave force

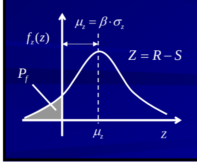
Evaluation of failure probability of existing structures

Deciding Target system failure probability

- Reliability indices of existing structures are calculated with first order reliability method (FORM) for understanding average failure probability of existing structures.
- About 40 cases were examined for each type of structures and design method.
  - * FORM method is categorized in level 2 of RBD.

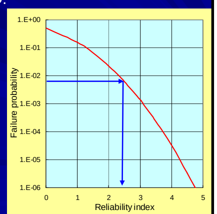
$P_f \le 8.7\times10^{-3}$

Average system reliability index of existing caisson type breakwater is 2.38.



μ_z: mean value
σ_z: Standard deviation

- Reliability index β



Partial factors used in TSPHF

Partial factor

$$\gamma_i = \left(1 - \alpha_i \beta_T \frac{\sigma_i}{\mu_i}\right)\frac{\mu_i}{x_{ki}}$$

Coefficient of variance V

Deviation of the characteristic value to mean value

Sensitivity

Target reliability index

Standard partial factor (Transient situation for wave)						
Target system reliability index β_T			2.38			
Target system failure probability P_{fT}			8.7×10^{-3}			
Target reliability used for partial factor β_T'			**2.40**			
			γ	α	μ/x_k	σ/μ
Sliding	γ_f	Coefficient of friction	**0.79**	0.689	1.060	0.150
	γ_{PH}, γ_{PU}	steep slope	**1.04**	-0.704	0.740	0.239
		shallow slope	**1.17**		0.825	0.251
	γ_{wl}	r_{wl}=1.5	**1.03**	-0.059	1.000	0.200
		r_{wl}=2.0,2.5	**1.06**		1.000	0.400
		H.H.W.L.	**1**		-	-
	γ_{WRC}	Unit weight of RC	**0.98**	0.030	0.980	0.020
	γ_{WNC}	Unit weight of NC	**1.02**	0.025	1.020	0.020
	γ_{WSAND}	Unit weight of sand	**1.01**	0.150	1.020	0.040

Too much factors!!

Summary

- New TSPHF is a fully performance based design code.
  - clarifies the performance requirements and verification structure of the code.
  - constructs a performance matrix for port facilities.
  - makes designers utilize their decision.
- Reliability based design concept is also introduced to new TSPHF.
  - Level 1 RBD
  - material factor format
  - code calibrations with about 40 existing structures
  - too many partial factors are needed

Thank you for your kind attention.

NILIM National Institute for Land and Infrastructure Management

PARI

Necessity of Code Harmonization for the Developing Countries. Mongolia Case Studies.

Prof. Erdene Ganzorig,
Mongolian University of Science and Technology
Structural Engineering Department
President of MACE

5th CECAR
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Necessity of Code Harmonization for the Developing Countries.

Mongolia Case Studies.

E.Ganzorig, Ph.D, MACE President

11th August, 2010, Convention and Exhibition Centre, Sydney, Australia

Recent situations & specifics

- The country is recently opened and willing to join with the international communities;
- Mongolia is a Member country of WTO since 1997;
- Country economy is very rapidly growing and expecting the growth will sharply increase for next years due to "bum" of mining;
- Due to luck of infrastructure, shortage of housing fund, the government is concentrating on an attraction of foreign investment;
- Mongolian National Design Codes and Code enforcement structure are mainly adopted from Russia, so already began some initiatives to change this situation;

Necessity of the Code development

- Codes are not sufficiently developed in terms of technical capacity and not harmonized with the international codes;
- Codes were became out of dated and can't cover some areas or advanced materials, structures & technologies;
- Request of the MACE to collaborate on National Design Code improvement within JSCE, MACE Cooperation;
- Still not existing in Mongolia an independent code for the establishment of general requirements on structural design;
- The Vision of National policy documents on the Code development;
- Performance Based Design (PBD) Concepts;

Background of the Code development

- Activities of the ACECC Subcommittee on "Harmonization of Design Codes in Asian Region"
- An assistance of the Central government Organization on Construction, which responsibility is a code
- Still not existing in Mongolia an independent code for the establishment of structural design general requirements
- Draft code proposal of the Russian Federation is carried out already, and it's enforced as local standard in organizations in Russia;
- National policy documents on the Code development
- International experience on implementation of Performance Based Design (PBD) Approachs;

Considerations on the code harmonization

- Close relationship with the central government is very essential;
- It is more advisable that, the activities on code harmonization are must be addressed on ACECC;
- First priority is must be given to the comprehensive codes then particular or specific codes;
- Because of luck of national capacity, it need some assistance from outside;
- As possible, the Performance Based Design (PBD) Concepts are must be introduced;
- It is very beneficial to train national code writers & engineers for the code development;

Reference materials

- "Structures and Foundation. Basis for the calculation", MNS 2111 - 82, 1982
- "Reliability of the Constructions and the foundations. Basis for the calculation". GOST 27751-88 (1+1999), (SD SEV 384-87)
- "Reliability of the Constructions and the foundations. General rules", Draft SNiP RF, 2008
- ISO 22111:2007, Basis for Design of Structures-General Requirements,
- ISO 2394:1998, General Principles on Reliability for Structures,
- EN1990, Eurocode 0: Basis of Structural Design, 2004 Revision

Performance Based Design Concepts

- "Basis of Design for Civil and Buildings Structures", MLIT, Japan 2002
- Code PLATFORM: Principles, guidelines and terminologies for structural design code drafting founded on the performance based design concept, Ver. 1.0, Japan Society of Civil Engineers, 2003, New technologies
- FEMA 273. Structural Engineers Assn. of California, Vision 2000 Committee.,
- FEMA 349, Action Plan for Performance Based Seismic Design, 2000
- Others

Objectives and Scope of the Code

- Established are general requirements for design of structures and foundation (building, civil etc. all kind)
- The code is a comprehensive design code (will serve as a basis for design codes for particular structures)
- Concepts from ISO 2394, General Principles on Reliability for Structures, EN1990, Eurocode 0: Basis of Structural Design are introduced

Terms and definitions

- General terms and definitions
  - Architectural & Civil engineering works, type of structures, maintenance, monitoring, repair & service etc.;
  - Construction material;
  - Codes & Standards;
- Design and response calculation terms
  - Design & Calculation basis;
  - Load, Effects & influences environment;
  - Modeling of Structures, Calculation model;
  - Material characteristics, parameters for calculation;
  - The Limit States;
  - Reliability;

General Requirements

- General concepts and conditions for the design
  - Reliability criteria;
  - Evaluation methods of reliability criteria;
  - Calculation basis:
    - **stable;**
    - **unstable;**
    - **accidental;**
- Durability of the structures and foundations
  - Pre condition for the durable structure;
  - Ultimate & Fatigue strength;
  - Design working life;

Limit states

- General requirements
  - Classification of limit states
    - I group of limit states
    - II group of limit states
    - Accidental limit states
    - Other limit states
- Structural calculation according limit states
  - Calculation basis & model;
  - Factors for the calculation:
    - Design working life;
    - Material characteristics & parameters;
    - Load & effects, their combinations;
    - Performances of the structure in limit state;
    - Influences of production, construction & maintenance;

Loads and actions

- General requirements;
- Classification of loads & effects
  - According response of the structure:
    - Static;
    - Dynamic;
  - According duration of the action:
    - **Permanent;**
    - **Variable for long term;**
    - **variable for short term;**
    - **Accidental;**
- Design value of the loads & effects
- Combinations of loads and effects
  - Main combinations;
  - Combination, in which included accidental loads;

Materials and soil

- Characteristics of construction materials and soil
  - Strength characteristics;
  - Deformation characteristics;
  - Other physical and mechanical characteristics;
  - Values of the parameters of characteristics:
    - Nominal value;
    - Design value;
- Working condition of the structures, materials & soil;
  - Working conditions are reflected in a calculation by multiplying factors;

Importance or significance of the structures

- Significance of the structures is reflected in a calculation by multiplying factor;
- Who where estimate the significance of the structures;
- Levels or categories of the significance; for example:
  - I category – essential structures
  - II category – important structures
  - III category – ordinary structures
  - IV category – less important structures

Requirements for the Calculation model

- Factors for build up the calculation model
  - Specifics of design and detailing
  - Performance specifics of structure before reach the limit state
  - Loads & effects
  - Working condition
  - Pre conditions & assumptions
- Composition of the Calculation model
  - Model of Loads and effects
  - Stress – strain relationship model
  - Performance model against external actions
- Test model of the calculation model

Quality control

- Objects for the Quality control
  - Design works and it's stages & components
  - Products , materials & elements of the structures
  - Quality of construction works
- Stages of the Quality control of materials, products & elements of the structures
  - Design phases;
  - Geological investigation phases;
  - Production phases of materials, products & elements;
  - Construction phases;
  - Maintenance, repair & service phases;
- Stages of the Quality control of design process
  - Estimation phases of requirements , conditions & TOR;
  - Calculation model creation & calculation phases
  - Design drawing & documentation phases;
  - Other phases not regulated by the code;

Technical evaluation of the structures

- Evaluation background
  - Plan & time schedule of technical services;
  - Request of the Client or owner;
  - Request or order of the government organization;
- Time & condition to perform the evaluation
  - Design working life is finished;
  - For reconstruction purpose;
  - Maintenance schema is changed;
  - For work of scheduled repair;
  - After disaster or accident;
- Investigating & reporting of technical evaluation;
- Requirements for the technical evaluation survey & calculation;

Performance based design concepts

- Performance of the structures
- Performance objectives
- Performance requirements of structures
- Performance criteria
- Performance verification methods
  - Mandatory according the code methods
  - Non mandatory according the codes methods

Activities, should be conducted within the MACE, JSCE collaboration on Design Code development in Mongolia

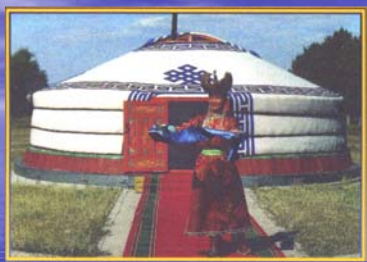
- Develop the national code named as "Basis of Structural Design. General requirement" ;
- Renew the national standard named "Structures and Foundation. Basis for the calculation" MNS 2111 - 82, ;
- Organize training of national code writers & engineers, JSCE MACE joint seminars etc;
- Develop comprehensive, guiding document about the PBD Concept using references, such as JSCE "PLATFORM", Guide of MLIT of the Japan and so on.;

Activities, conducted within the MACE, JSCE collaboration on design code development in Mongolia

- Collected a necessary information and organized series WG meetings;
- Renewed and submitted the Proposal for Code Development with some required funding to the Ministry;
- Key understandings of ISO 2394 and 22111 are prepared in Mongolian;
- Made full translation of Draft Code and Standard of Russian Federation;
- Translation of JSCE, Code Platform from English to Mongolian is now going;
- Translation of JSCE, Code Platform from English to Mongolian is now going;
- Made translation of ACECC Glossary for PBD;
- Preparation of First Draft of Code "Basis of Structural Design" is now going;
- Organized are the JSCE and MACE WG meetings in Ulaanbaatar, Hanoi and Fukuoka;
- According the request of MAVE, the JSCE sent experts to the Mongolia and organized the training for 3 time.

Conclution

- ACECC Technical Subcommittee TC-8 on Code Harmonization in Asian Region is essential for us, for developing countries, it need to continue the committee activities;
- Introduction of PBD concepts is a key issue for the harmonization of design codes;
- Under framework of T8 committee activities, most desirable issue is an assistance for national capacity building in developing countries;



Thank you for your attention!

Globalisation and the Harmonization of Design and Material Standards within the Asian Region – an Australian Perspective

Mr. Phil Blundy
Councillor of Standards Australia,
Chair of Structural College, EA

ENGINEERS AUSTRALIA
my organisation

Globalisation and the Harmonization of Design and Material Standards - an Australian perspective

Philip Blundy
Independent Chair of Loading Codes, Standards Australia
Chair of Structural College, Engineers Australia
Principal, Cardno

ENGINEERS AUSTRALIA

INTRODUCTION

1. Recent Australian Standards
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   - New Funding and Process
   - Priorities

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RECENT AUSTRALIAN STANDARDS

- AS5100 - 2004 Bridges
- AS1170.4 -2007 Earthquake Actions
- AS3600 - 2009 Concrete Structures

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BRIDGE DESIGN AS5100 - 2004

- Goal - National Bridge Design Standard
- Vehicle Loading – future proofing…
  - Vehicle
  - Barriers and Collision loads
- Material Standards
  - e.g. Concrete AS3600
- Durability“

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EARTHQUAKE ACTIONS AS1170.4 - 2007 /NZS1170.5

- Goal - Common (not identical) National Loading Standards
  - AS1170.0 General Principles,
  - AS1170.1 Permanent & Imposed,
  - AS1170.2 Wind Actions
- Draft Standard Developed

The Golden Eagle Hotel in Kalgoorlie was damaged in the earthquake

- Consensus not reached -
  - Agreed to develop independent Standards

CHILE - building damaged in the earthquake

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CONCRETE STRUCTURES AS3600 - 2009

- Goal – Contemporary Concrete Standard
- Durability
- Concrete Strength 25MPa – 100MPa
- Strut and Tie Methods
- Class L Reinforcement (elongation 1.5%)
  - Ductility
- Development Lengths and Lap Splices
  - Lap splices > development length

ENGINEERS AUSTRALIA

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STANDARDS AUSTRALIA - GOALS

- Standards Australia goals-
  - Maximize Use of International Standards
  - Standards ONLY produced where Appropriate
  - Driven by Commitment to Stakeholders
  - Benefit Australian Community

STANDARDS AUSTRALIA - DEVELOPMENT

- Priority / Needs Driven Program
- Development Paths (and funding)
  - SA Project Management
  - Independent Project Management, SA secretariat
  - External Development
- Scrutiny and Probity
  - Still the same rigorous review and consensus
- Research
- International Cooperation – engagement with ISO

STANDARDS AUSTRALIA - FUNDING

- Standards Australia goals-
  - Maximize Use of International Standards
  - Standards ONLY produced where Appropriate
  - Driven by Commitment to Stakeholders
  - Benefit Australian Community
- BUT Who pays?
  - Government, Regulator?
  - User?
  - Stakeholder?

GLOBAL MARKETPLACE

- Construction Materials
  - Steel sections, prestressing wire
  - Bolts and welding
  - Cement, glass, timber etc.
- Fabrication
  - Offshore competition
- Engineering Services
  - Loading standards
  - Materials standards

FUTURE IN AUSTRALIAN STANDARDS - HARMONISATON

- Standards Australia commitment!
- International harmonization = ISO?
- <u>Differences</u>
  - Terminology and Language
  - Units of Measure
  - Design Philosophy
    - <u>Material</u> capacity factors v <u>Member</u> capacity factors
    - Safety Indices
  - Eurocode? Japan? China? India? USA?
  - Regulatory Background

SUSTAINABILITY & CLIMATE CHANGE

- Salinity (durability)
- Sea level
- Flooding
- Cyclonic Wind
- Temperatures
- Sustainable
  - Construction
  - Operation

Tsunami damage

GLOBAL HARMONISATION

- Team A
    - Product and Material Suppliers
    - Constructors
    - Consultants
    - Researchers and Experts
    - Regulators and Agencies
- Team B
    - Regulators and Agencies

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CONCLUSION

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2010 YEAR OF ENGINEERING LEADERSHIP

15

A Treatise of Current Australian Steel and Steel-Concrete Composite Standards and Comparisons with Other International Standards

Prof. Brian Uy
Head of School, School of Engineering & Director, Civionics Research Centre,
University of Western Sydney

A Treatise of Current Australian Steel and Steel-Concrete Composite Standards and Comparisons with Other International Standards

Professor Brian Uy
Head of School, School of Engineering &
Director, Civionics Research Centre,
University of Western Sydney

"I have not found a better way to introduce you to these thoughts on construction than through my own projects, and, somewhat like an author writing his first book, one always gets a little autobiographical."

Santiago Calatrava
(Eminent Architect and Structural Engineer)
From Conversations with Students,
The MIT Lectures, Princeton Architectural Press (2002)

ABSTRACT

This paper introduces the five main codes of practice published by Australian Standards which relate to design of steel structures for buildings and bridges respectively. For buildings structures unlike overseas standards such as the new Hong Kong Steel Standard and the long established American Institute of Steel Construction, Australian Standards for the design of steel structures are quite fragmented yet extremely comprehensive. Rather than reflecting structural systems, Australian Standards tend to deal with material types and thus individual standards deal with different types of steel and also composite steel-concrete forms. The five main codes of practice in Australia which relate to steel structures include AS2327.1-2003 Composite Structures; AS4100-1998 Steel Structures; AS/NZS4600-2005 Cold Formed Steel Structures; AS/NZS4673-2001 Cold Formed Stainless Steel Structures; and AS5100.6-2005 Bridge design, Part 6: Steel and Composite Construction. This paper will outline the general principles in each standard and a few examples of projects and how these would need to be designed are given. In addition over the last two decades there have been many situations in Australia where the current codes of practice for steel structures are not able to be used for various projects. Issues dealing with these cases will also be addressed and the methods for design will also be discussed. Research projects and design recommendations in order to deal with such situations is also outlined.

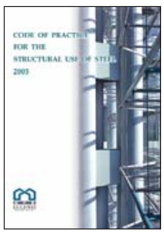
INTRODUCTION

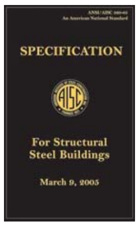
There are all encompassing documents which must be adhered to in Australia. The two key documents which relate to building and bridge construction respectively are:

- Building Code of Australia (Australian Building Codes Board, 2006); and
- Bridge Design Standard (Standards Australia, 2004)

Australian Encompassing Documents

Overseas Steel Standards, (Hong Kong Buildings Department, 2005 and American Institute of Steel Construction, 2005)





Australian Standards

Thus unlike overseas standards for structural steel design, (Hong Kong Buildings Department, 2005 and American Institute of Steel Construction, 2005), Australian Standards call up specifications within the two documents shown in Figure. The following section will briefly outline the various standards for steel structures:

- AS2327.1-2003 *Composite structures: simply supported beams*
- AS4100-1998 *Steel Structures*;
- AS/NZS4600-2005 *Cold formed steel structures*
- AS/NZS4673-2001 *Cold formed stainless steel structures*
- AS5100.6-2004 *Bridge design, Part 6 Steel and composite construction*

AS2327.1-2003 *Composite structures: simply supported beams*

AS2327.1-2003 *Composite structures: simply supported beams*

This Australian Standard was produced by committee BD32. The Australian Standard deals with the design of simply supported composite-steel concrete beams. The standard was firstly released in 1996 in limit states format, (Standards Australia, 1996). The major innovations in this standard are the ability to allow the use of partial shear connection. The standard also requires designers to pay close attention to the various stages of loading, namely construction, service and ultimate loading stages. Committee BD32 also has a remit a standard for composite slabs, continuous composite beams and composite columns and significant work is currently ongoing in this area.

AS2327.1-2003 *Composite structures: simply supported beams*

AS4100-1998 *Steel Structures*

AS4100-1998 *Steel Structures*

This Australian Standard was produced by committee BD1. This Australian Standard is a primary reference standard for the Building Code of Australia, Australian Building Codes Board, 2006) and deals with the design of bare steel structures. The standard was firstly released in 1990 in limit states format, (Standards Australia, 1990). One of the major innovations in this standard is the ability to allow the use of advanced analysis. The standard limits the yield stress of the material to 450 MPa (N/mm^2).

AS/NZS4600-2005
Cold formed steel structures

AS/NZS4600-2005
Cold formed steel structures

This is one of the first standards to be written as a harmonised standard between Standards Australia and Standards New Zealand and was produced by committee BD82. This Standard will be referenced in the Building Code of Australia 2006, thereby superseding AS 4600—1996. The standard deals primarily with closed and open thin walled sections produced by cold working with thicknesses less than 25 mm. One of the innovations is the ability to design elements using the direct strength methods, whereby buckling modes are determined to allow for the interaction of the component plates in the cross-section. The standard would be primarily used in the design of secondary structural elements such as purlins and girts, and structures where live loads are generally quite low in proportion to dead loads.

AS/NZS4673-2001
Cold formed stainless steel structures

AS/NZS4673-2001
Cold formed stainless steel structures

This is another one of the first standards to be written as a harmonized standard between Standards Australia and Standards New Zealand and was produced by committee BD86. The standard deals with stainless steels with at least 10.5% chromium and up to 1.2% Carbon. This standard also is concerned primarily with closed and open thin walled sections produced by cold working. The standard draws heavily on overseas standards, such that Sections 1, 2, 3, 4 and 5 of this Standard is based on ANSI/ASCE-8-90 Specification for the Design of Cold-formed Stainless Steel Structural Members. Section 6 is based on AS/NZS 4600 and AS/NZS 1664.1.

AS5100.6-2004 *Bridge design,*
Part 6 Steel and composite construction

AS5100.6-2004 *Bridge design,*
Part 6 Steel and composite construction

This standard is part of the overall AS5100 Bridge design series and was produced by committee BD90 which was a partnership between Standards Australia, the Australasian Railway Association and AUSTROADS. The Standard deals with the design of members in steel and composite construction. The standard draws heavily on the Australian Standards, AS4100-1998 and AS2327.1-2003 (Standards Australia, 1998 and Standards Australia, 2003) for beam and column design. The standard is also however also able to deal with composite construction members which may prove to be a forerunner to the development of a standard for composite columns produced by BD32 for buildings.

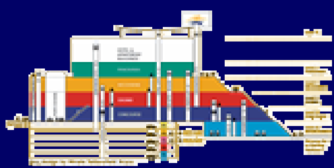
APPLICATIONS AND CASE STUDIES

- Star City, Sydney (1995)

Star City, Sydney (1995)

- High strength steel columns
- Composite beams
- Composite slabs
- High strength steel trusses

Star City, Sydney (1995)



CONCLUSIONS

This paper has briefly outlined the five main codes of practice published by Standards Australia which relate to design of steel structures for buildings and bridges respectively. The five main codes of practice in Australia which relate to steel structures include AS2327.1-2003 *Composite Structures*; AS4100-1998 *Steel Structures*; AS/NZS4600-2005 *Cold Formed Steel Structures*; AS/NZS4673-2001 *Cold Formed Stainless Steel Structures*; and AS5100.6-2005 *Bridge design, Part 6: Steel and Composite Construction*. Some salient features of these standards have been outlined and a few simplified case studies have been given to show how they can be applied.

CONCLUSIONS

An example of a building which has fallen outside the scope of existing steel standards have also been given. In many ways it has been the tail wagging the dog in many instances. However, more recently, research has become more pro-active and solutions for industry have had some of their fundamentals founded in the research that has been conducted by Australian universities. Much of the research conducted in Australia has been underpinning the applications and it is pertinent that Australian Standards need to be properly developed to support the applications more pro-actively. Future harmonisation of international standards whereby countries like Australia align with other nations to develop international standards is the subject of this session and it is important to understand the Australian landscape in embarking on such a task. Initial developments by Standards Australia have seen progress in the development of harmonised standards with New Zealand.

Future Developments of the Eurocode 4

Prof. Dennis Lam
Chair in Structural Engineering
School of Engineering, Design & Technology
University of Bradford, UK

Future Developments of Eurocode 4

by

Dennis Lam

CONTENTS

- Introduction
- Future developments of Eurocode 4
- On-going researches

INTRODUCTION

- To harmonise all the code of practices across the whole European communities.
- To harmonise between different construction materials and construction methods.
- To achieve full consistency and compatibility in terms of loading, safety factors, etc.
- To eliminate technical obstacles to trade and harmonisation of technical specification.

INTRODUCTION

Eurocode 0: Basis of Structural Design
Eurocode 1: Actions on structures
Eurocode 2: Design of concrete structures
Eurocode 3: Design of steel structures
Eurocode 4: Design of composite steel and concrete structures
Eurocode 5: Design of timber structures
Eurocode 6: Design of masonry structures
Eurocode 7: Geotechnical design
Eurocode 8: Design of structures for earthquake resistance
Eurocode 9: Design of aluminium structures

INTRODUCTION

Eurocode 0: Basis of Structural Design
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Eurocode 3: Design of steel structures
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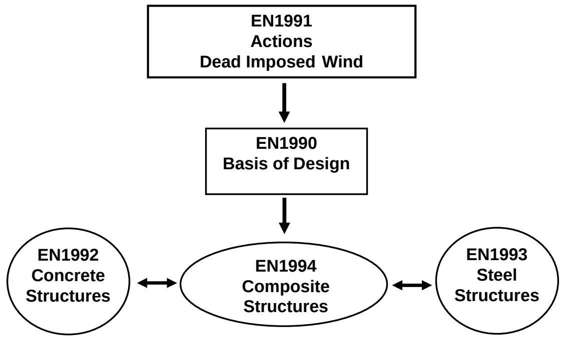
Eurocode 5: Design of timber structures
Eurocode 6: Design of masonry structures
Eurocode 7: Geotechnical design
Eurocode 8: Design of structures for earthquake resistance
Eurocode 9: Design of aluminium structures

INTRODUCTION

Eurocode 4: Design of composite steel and concrete structures

EN 1994-1-1: General rules and rules for buildings
EN 1994-1-2: Structural fire design
EN 1994-2: Bridges



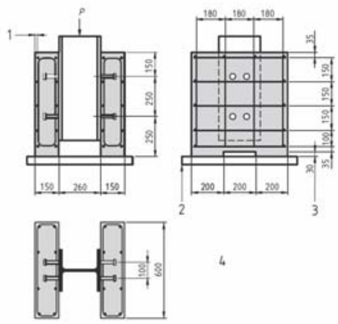
Other Documentations

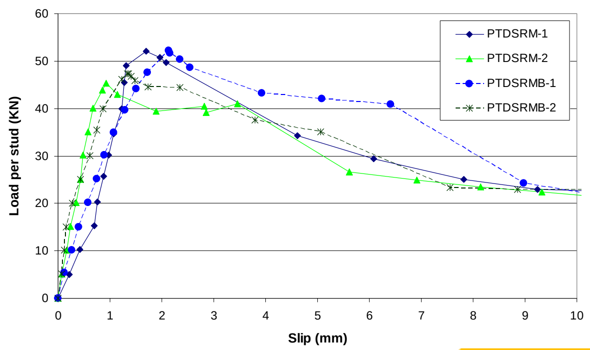
- The Eurocodes are published by the National Standards body for use in that country, together with **National Annexes**, one for each part of the Eurocode.
- The National Annex contains information on those parameters which are left open for national choice, known as **Nationally Determined Parameters.**
- Nationally Determined Parameters, NDP, may cover: values and/or classes where alternatives are given in the Eurocode, values to be used where a *symbol only* is given in the Eurocode, *country specific data* (geographical, climatic, etc.), e.g. snow map, the procedure to be used where *alternative procedures* are given in the Eurocode.
- The **National Annex** may also contain:
  " decisions on the application of informative annexes,
  " references to non contradictory complementary information **(NCCI)** to assist the user to apply the Eurocode.

CURRENT GAPS & FUTURE DEVELOPMENTS

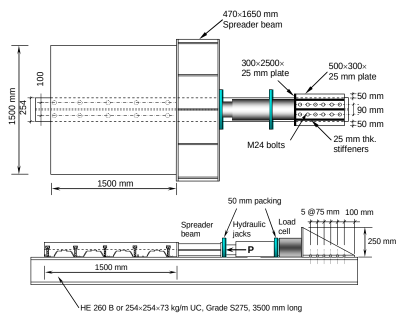
- New specific push test procedure for studs in profile steel sheeting
- Ductility of studs in profiled steel sheeting
- Special types of concrete slabs (hollow core)
- Concrete strength classes greater than C60
- Steel grades greater than 460
- Frame design: sway stability, disproportionate collapse.

STANDARD PUSH TEST





NEW PUSH TEST



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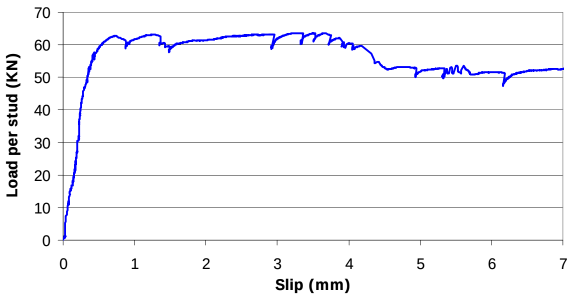

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COMPOSITE BEAM WITH HOLLOWCORE SLABS

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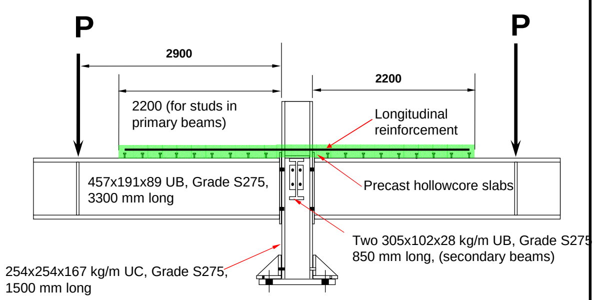
FRAME STABILITY



www.bradford.ac.uk

Proposed Equations for Shear Stud Capacity in Hollowcore Slabs to Eurocode 4

$$P_{RD} = 0.8 f_u (\pi d^2 / 4) / \gamma_v$$

$$P_{RD} = 0.29 \alpha \beta \varepsilon d^2 \sqrt{\omega f_{cp} E_{cp}} / \gamma_v$$

The partial safety factor γ_v should be taken as 1.25

Proposed Equations for Composite Joints with Hollowcore Slabs to Eurocode 4

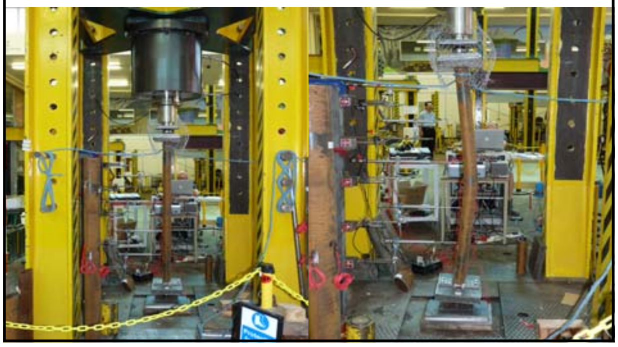
Joint Moment Capacity:

$$M_{Rd} = F_{r,t}(D_b + D_r - 0.5t_f) + F_{b,t}(D_b - r_1 - 0.5t_f)$$

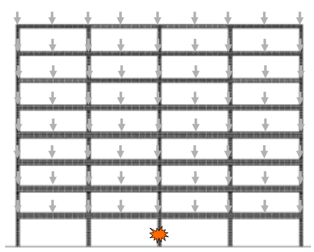
Joint Rotation Capacity:

$$\phi_u = \frac{\Delta L}{D_b + D_r} + \frac{Slip}{D_b}$$

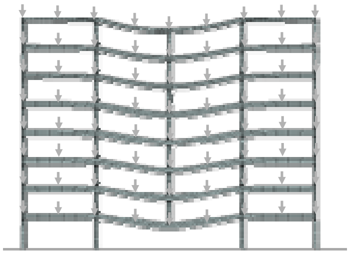
CFT Columns with High Strength Concrete



FRAME STABILITY



FRAME STABILITY



Speaker’s details

ACECC TC-8 Special Forum on Harmonization of Design Codes in the Asian Region

SPEAKER'S DETAILS

NAME OF SPEAKER:

Dr. Yoshiaki Kikuchi

TITLE OF PRESENTATION:

"Recent Revision of Japanese Technical Standard for Port and Harbour Facilities (TSPHF) Based on a Performance Based Design Concept"

BRIEF SUMMARY OF YOUR PRESENTAION:

In this presentation, the revision of the Technical Standards for Port and Harbor Facilities (TSPHF) which was recently revised in April 2007 will be introduced. It is thought that the TSPHF is one of the first cases of a revision of a design code based on a performance based design/specification concept. First, the reason why a performance based design concept was introduced to the TSPHF is explained. Then, the philosophy of providing a performance concept is explained. The standard verification procedure in the TSPHF guidelines is explained using an example. Finally, the policy for determining the geotechnical parameters used for the performance based design concept is introduced.

CURRENT EMPLOYER/ORGANISATION & POSITION:
Port & Airport Research Institute
Director, Geotechnical and Structural Engineering Department

QUALIFICATIONS: (Degrees, University/College, Subject, Professional Membership)
Doctor of Engineering
Visiting professor of Yokohama National University and Kumamoto University
Menber of International Society of Soil Mechanics and Geotechnical Engineering
Menber Of JSCE, Japanese Geotechnical Society

BRIEF CAREER SUMMARY:
Dr. Yoshiaki KIKUCHI obtained his Bachelor (1981), Master of Engineering (1983), and Doctor of Engineering (2002) from University of Tokyo, Japan.
He joined Port and Harbour Research Institute in 1983 as a research engineer.
He became the Head of Foundations Division in 1996.
The name of Port and Harbour Research Institute was changed to Port and Airport Research Institute in 2001.
He is now Director, Geotechnical & Structural Engineering Department, PARI and a visiting proffessore of two universities.

SPECIAL AWARDS/PRIZES, DECORATIONS etc:
Technical Development Award, Japan Port and Harbour Association, May,2003.
Geotechnical Environmental Award, JGS, May 2009.

MEMBERSHIP OF TECHNICAL COMMITTEES:
A member of the drafting committee of a standard of Japanese Geotechnical Society 'Principles for foundation designs grounded on a performance-based design concept.'

PUBLICATIONS (Number and any relevant examples):
About 200 papers.
Investigation of Engineering Properties of Man-made Composite Geo-materials with Micro-focus X-ray CT, 2006.
New Technical Standard for Port and Harbor Facilities in Japan - New TSPHF -, 2008.
Change of Failure Mechanism of Cemet Treated Clay by Adding Tire Chips, 2008
Bearing Capacity Evaluation of Long, Large Diameter Open Ended Piles, 2008
Durability of Cement Treated Clay with Air Foam Used in Water Front Structures, 2010.
Multifaceted potentials of tire-derived three dimensional geosynthetics in geotechnical applications and their evaluation, 2010.

SPEAKER'S DETAILS

NAME OF SPEAKER:

Prof. Erdene Ganzorig

TITLE OF PRESENTATION:

"Necessity of Code harmonization for the developing countries. Mongolia case studies."

BRIEF SUMMARY OF YOUR PRESENTAION:

Described are the necessities of Code Harmonization for the rapidly developing countries such as Mongolia. Presented are the common conditions in developing countries. Summarized are the activities between MACE and JSCE on the collaborative work on code development. Introduced is the summary of proposed code for structural design in Mongolia.
Also made attempts to figure out possible future activities on the Code development in Mongolia and expectations to the ACECC in this issue.

CURRENT EMPLOYER/ORGANISATION & POSITION:

Mongolian University of Science and Technology, School of Civil Engineering and Architecture, Professor in Structural Engineering Department

QUALIFICATIONS: (Degrees, University/College, Subject, Professional Membership)

Mongolian State University, Master on Structural Engineering, 1981
Moscow University of Civil Engineering, Ph.D, 1990-1994
Japan, IISEE, Earthquake Engineering Training, Diploma, 1996-1997

President, Mongolian Association of Civil Engineers
Vice President, Mongolian National Construction Association
Executive Committee Member, Asian Civil Engineering Coordinating Council
Member, National Academy of Engineering Science
Member, Doctoral Degree Board on Civil Engineering
Board, JICA Alumni Association in Mongolia
Board, American Concrete Institute, Mongolian Chapter

BRIEF CAREER SUMMARY:

2008 - to present, Lecturer, Mongolian University of Science and Technology, Structural Engineering Department,
2002-to present, Goo Van Consulting Co., Ltd, Consultant.

2006-2007, Vice Director, State Agency for Construction, Urban Development and Public Utilities, Mongolia
1997-2005, Director, Infrastructure Training Institute.
1984-1997, Lecturer, Mongolian Technical University.
1981-1984, Structural Engineer, National Institute for Architectural and Civil Engineering Design.

SPECIAL AWARDS/PRIZES, DECORATIONS etc:

Labour Medal, President of Mongolia
Medal of Democracy, President of Mongolia
Grand Sertificate of the Ministry for Achievement, MRTCUD, Mongolia
Honorory Builder, MRTCUD, Mongolia
Engineer of Best Design Award, 2009, Mongolian Union of Architects

MEMBERSHIP OF TECHNICAL COMMITTEES:

Chair, Technical Committee for High Rise Building and Earthquake Engineering
Member, Science and Technology Council under Ministry, MRTCUD, Mongolia
Member, Engineering and Architectural Qualication Board, MRTCUD, Mongolia
Member, National Engineering Accreditation Board

PUBLICATIONS (Number and any relevant examples):

Publications ~ 20
Research & Science articles ~ 30
Design Code developed ~ 6
Mongolian National Standard developed ~ 5
Structural Design Projects, ~ 30 Projects
Consultant to Structural Design, ~ 20 Projects
Examples:

“FEM Educational Software Development”, Developer, 1989
UN Project “RADIUS – Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters”, Ulaanbaatar City Representative, 1998-2000
UNDP/UNCHS Project MON/99/301, “Earthquake Disaster Risk Management Scenario for Ulaanbaatar”, National Consultant, 1999-2000
UNDP Project MON/99/G35 “Commercialization of Super-Insulated Buildings in Mongolia”, National Consultant, 2002
Translation of FIDIC “Conditions of Contract for works of Civil Engineering Construction” Part I, II, III into Mongolian, 2002
and etc.

ACECC TC-8 Special Forum on Harmonization of Design Codes in the Asian Region

SPEAKER'S DETAILS

NAME OF SPEAKER:
Philip Blundy

TITLE OF PRESENTATION:

Globalisation and the Harmonization of Design and Material Standards within the Asian region – an Australian perspective

BRIEF SUMMARY OF YOUR PRESENTAION:

Australian Engineer's perspective about this issue as one of the countries which have been influenced by British Standards and American Standards.
including

1) Standards Australia thinking about the harmonization of design codes, especially in the Asian region,
2) Standards Australia strategies towards globalisation and harmonization of design standards, and
3) Past and present activity regarding collaborative work towards the globalisation and harmonization within Asia.

CURRENT EMPLOYER/ORGANISATION & POSITION:

Cardno (NSW/ACT) Pty Ltd

Principal Engineer

QUALIFICATIONS: (Degrees, University/College, Subject, Professional Membership)

B.E. (Hon I) UNSW

MEngSc (Structures) UNSW

Fellow - Institution of Engineers Australia

- Chairman of Structural College
- Standard Australia Councillor

Member - Permanent Way Institute (NSW)

IABSE

BRIEF CAREER SUMMARY:

Philip has over 28 years experience working with engineering organisations in consulting engineering and state government departments in Australia and overseas. He has been involved in development projects from preparation of master planning and feasiblity studies through concept, preliminary and final designs and site activities for major projects both locally and internationally and is an accredited Proof Engineer for VicRoads.

Philip has led design teams both in Australia and internationally in the structural design of rail and road bridges, public buildings, low cost government housing, schools and hospitals, infrastructure developments in several countries including Australia, Bahrain, Dubai, Malaysia, Thailand, Taiwan and Hong Kong.

Philip has worked with design-construct and architectural teams on a wide range of international developments including Taiwan High Speed Rail viaducts; verification of Barito suspension bridge, Indonesia; Palace for the Crown Prince of Bahrain; Emirates Towers, Dubai; and stations for the mass transit system, Bangkok. Philip has often worked in design teams overseas including periods in offices in Europe, the Middle East, Taiwan and South East Asia.

Significant Projects:

Gateway Upgrade Project, Brisbane, Queensland

Team Leader for design management of 13 new bridges and bridge widenings south of the Gateway Bridge.

Design Verification - Incrementally Launched Bridges

Superstructure design verification of bridges at Lawrence Hargrave Drive-Wollongong and South Creek-Windsor

Parramatta Rail Link - Design Coordinator – Underground Station Structures

On secondment to Parsons Brinckerhoff. Responsible for the design and coordination of the station structures, including platforms, suspended concourse and service buildings. A significant feature of the stations is the suspended concourse floor which cantilevers 6m directly from the cavern rock support.

Taiwan High Speed Rail - Viaducts

Team Leader for 13.5km of viaduct for contracts C230 & C240. Design development and delivery of construction documents for 30m-45m single box prestressed cast-in-situ viaducts, including seismic and dynamic analysis and design. Also designed were 50m and 80m balanced cantilever bridges. Design Management Team for co-ordination of viaduct submissions with design-build contractor.

Barito Bridge - Indonesia

Project Leader for design check of 800m dual cable suspension bridge in Indonesia. The two main spans of 250m utilise a unique cable-stayed arrangement that was developed for use in under-developed countries.

Gudaibiya Palace, Bahrain

Designer for new palace for the ruling monarchy. Scope of work included strengthening of existing submerged basement structure, and documentation of five storey building over, including many long-span structures over formal and regal spaces

Federation Square, Flinders Street, Melbourne

Project Leader for Museum of Australian Art (MoAA), and other commercial developments for the Federations Square Project. The construction of a new 400,00m sq composite steel and concrete deck over the multi-track railway between Flinders Street Station and the former Jollimont Railway Yard provides the base for the construction of a new centre for the arts in Melbourne. Philip was responsible for the design development and documentation of the MoAA and for overall design review of the other structural components including the new composite deck across the main railway. Project value: $400m.

Emirate Towers, Dubai

Project Leader (Sydney) for the twin towers development in Dubai. The two towers are both over 300m high, with the office tower 350m high ranking in the top ten tallest buildings of the world. The building design incorporates mega-frame design concepts to control occupant comfort and strength design for wind and earthquake.

Tattersall Club Redevelopment, Queens St Mall, Brisbane
Design and documentation of a multi-storey complex incorporating retail, entertainment, residential, gymnasium and swimming pool areas. The building is designed to resist earthquake and cyclonic forces through a perimeter beam and column system. The gymnasium and pool are located directly over suites and are supported by high efficiency damping bearings. Long spans of up to 11m create large column free space over the ballroom below.

Novotel Hotel Darling Harbour - Pyrmont, Sydney
Project Leader for the structural design for a 14 storey building. The hotel is built over an existing steel framed car park. A recreational area built over the car park includes a steel truss support for a swimming pool spanning 17m and a steel truss pedestrian footbridge spanning 35m to a new monorail station.

Landmark Hotel - Sydney
Structural designer and team leader for the 18 storey structure including a major steel transfer structure and eight storey car park, Woolloomooloo.

SPECIAL AWARDS/PRIZES, DECORATIONS etc:

Water Board Gold Medal – public health engineering

MEMBERSHIP OF TECHNICAL COMMITTEES:

Independent Chairman – Standards Australia BD-06 (Loading Standards)
Member – Standards Australia BD-02/06 (Concrete – serviceability)

PUBLICATIONS (Number and any relevant examples):

May 2010	**RECENT EXAMPLES OF STANDARDS DEVELOPMENT AND THE NEW VISION IN AUSTRALASIA** **IABSE Conference, Croatia**
Aug 1999	**"HPC Challenges Facing the Designer"** **CIA/EA Seminar**
Jan 1997	**High Performance Concrete: A Problem or a Problem Solution** **CIA Seminar**

ACECC TC-8 Special Forum on Harmonization of Design Codes in the Asian Region

SPEAKER'S DETAILS

NAME OF SPEAKER:
Professor Brian Uy
Head of School of Engineering &
Director Civionics Research Centre
University of Western Sydney

TITLE OF PRESENTATION:
A treatise of Current Australian Steel and Steel-Concrete Composite Standards and Comparisons with other International Standards

BRIEF SUMMARY OF YOUR PRESENTAION:
This paper will examine the broad framework for Australian Standards in Steel and Steel-Concrete Composite Standards and compare and contrast it with other overseas standards, namely AISC, Eurocodes and Hong Kong Building Standards

CURRENT EMPLOYER/ORGANISATION & POSITION:
Head of School of Engineering &
Director Civionics Research Centre
University of Western Sydney

QUALIFICATIONS: (Degrees, University/College, Subject, Professional Membership)
BE (Hons 1), PhD *UNSW* CPEng, CEng, PE, MIEAust, (NPER), MIStructE, MICE, MASCE, MAICD
Bachelor of Engineering in Civil Engineering with First Class Honours
Doctor of Philosophy, University of New South Wales

BRIEF CAREER SUMMARY:
Professor Brian Uy is the Head of School of Engineering and the Director of the Civionics Research Centre at the University of Western Sydney. He was also a member of the Australian Research Council College of Experts for Engineering and Environmental Sciences from 2007 - 2009, which provides advice on research funding and excellence to the Australian Government. Brian was Professor of Structural Engineering and Head of the School of Civil, Mining and Environmental Engineering at the University of Wollongong from 2004-2007. He has also held positions at the University of New South Wales, Sydney; Imperial College of Science Technology and Medicine, London; National University of Singapore; Ove Arup and Partners (now ARUP); Wholohan Grill and Partners (now WorleyParsons) and Wargon Chapman and Partners (now Hyder). Brian is currently the Engineers Australia, College of Structural Engineers representative of the Standards Australia Committee BD32 on Composite Structures and a member of the Standards Australia Committee BD02 on Concrete Structures. In 2008, he was elected Vice-Chair of the Australia Division of the Institution of Structural Engineers, United Kingdom. Brian is a chartered engineer in Australia, the UK and USA and regularly provides higher level consulting advice for certification and forensic purposes.

SPECIAL AWARDS/PRIZES, DECORATIONS etc:
MEMBERSHIP OF TECHNICAL COMMITTEES:
Brian serves on the editorial boards of seven international journals for structural engineering and is a significant contributor to international codes of practice in steel and composite construction. He

currently serves on the American Institute of Steel Construction (AISC) Task Committee 5 on Composite Construction and the International Association for Bridge and Structural Engineering (IABSE), Working Commission 2 on steel, timber and composite structures. Brian also serves as a member on the American Society of Civil Engineers (ASCE) – Structural Engineering Institute (SEI), Technical Committee on Composite Construction. Brian is a chartered engineer in Australia, the UK and USA, regularly providing higher level consulting advice for certification and forensic purposes.

PUBLICATIONS (Number and any relevant examples):
Brian has been involved in research in steel-concrete composite structures for 20 years and has published over 400 articles. Much of this research has been underpinned by competitive grant funding from the ARC and industry totalling over $9 million. Brian serves on the editorial boards of seven international journals for structural engineering and is a significant contributor to international codes of practice in steel and composite construction.

ACECC TC-8 Special Forum on Harmonization of Design Codes in the Asian Region

SPEAKER'S DETAILS

NAME OF SPEAKER:

Professor Dennis Lam
Chair in Structural Engineering
School of Engineering, Design & Technology
University of Bradford
UK

TITLE OF PRESENTATION:

Future Developments of the Eurocode 4

BRIEF SUMMARY OF YOUR PRESENTAION:

The Eurocode 4 has now been implemented in the UK since April 2010. In this presentation, an overview of the Eurocode structures is presented together with its treatments regarding the design of composite structures. In addition, the future developments of the Eurocode 4 will be discussed in detail especially in the areas currently being worked on by my research group.

CURRENT EMPLOYER/ORGANISATION & POSITION:

Chair in Structural Engineering
School of Engineering, Design and Technology
University of Bradford
UK

QUALIFICATIONS: (Degrees, University/College, Subject, Professional Membership)

BEng (Hons), MPhil, PhD, CEng, EurIng, FIStructE, MICE, MASCE, MIMgt
Bachelor of Engineering in Civil & Structural Engineering, University of Sheffield, UK
Master of Philosophy, University of Sheffield, UK
Doctor of Philosophy, University of Nottingham, UK

BRIEF CAREER SUMMARY:

Professor Dennis Lam is the Chair of Structural Engineering at the University of Bradford. He was formerly a Reader in Structural Engineering and Steel Design at the University of Leeds and Chief Structural Engineer for the City of Wakefield. He is a Chartered Engineer, Fellow of the Institution of Structural Engineers and Member of the Institution of Civil Engineers. Dennis is currently the president of the Association for International Cooperation and Research in Steel – Concrete Composite Structures (ASCCS); vice chair of the research panel and member of the academic qualification panel for the Institution of Structural Engineers.

SPECIAL AWARDS/PRIZES, DECORATIONS etc:
MEMBERSHIP OF TECHNICAL COMMITTEES:

Dennis serves on the editorial boards of five international journals for civil and structural engineering and is a member of the European Committee on Standardization CEN/TC250/SC4 and the British Standard Institute Committee B525/4 responsible for the composite construction in Europe and in the UK. He is currently a member on the American Society of Civil Engineers (ASCE) – Structural Engineering Institute (SEI), Disproportionate Collapse Standards and Guidance Committee and was previously served on the technical committee on composite construction.

PUBLICATIONS (Number and any relevant examples):

Dennis main research interests are in the area of steel and composite structures, including the use of stainless steel, precast concrete and fibre reinforced polymers. He has published more than 90 refereed papers and is the lead author of one of the most popular textbooks on structural steel design for students and practising engineers.

Opening greetings by Dr. Sakata

Dr. Horikoshi

Prof. Honjo