Development of Steel Design Codes in Thailand

The Engineering Institute of Thailand (E.I.T.)

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Outline of Presentation

- Introduction to Engineering Institute of Thailand
- Code Development Methodology by EIT
- Development of Codes for Steel Design
- Harmonization of Design Codes

The Engineering Institute of Thailand (E.I.T)

under his majesty the king's patronage

- Thailand oldest engineering professional society
- Found in 1943
- Consists of 8 engineering subcommittees including Civil Engineering
- There have been a few professional societies that grew out from EIT's C.E subcom. Such as Thai Concrete Institute, Traffic and Transportation society, etc.

Structure of E.I.T.

Board of Directors

- **Develop design codes**
- Promote education, research & practice of engineering profession
- Organize technical conference & workshop for better eng. practice
- Provide technical consultation for members relating to eng. problems
- Promote harmony among domestic organizations
- Collaborate with international organizations

Technical Committees

1. **Civil Engineering**
2. Electrical Eng.
3. Industrial Eng.
4. Mining, Metallurgy & Petroleum Eng.
5. Chemical Eng.
6. Environmental Eng.
7. Automotive Eng.
8. Mechanical Eng.

Civil Engineering Committee

Sub-committees

1. **Steel Structures**
2. Concrete
3. Wind and Earthquake Engineering
4. Geotechnical Engineering
5. Transportation Engineering
6. Water Resource
7. Construction Management and Planning
8. Computational Mechanics
9. Engineering Ethics and Society Services

E.I.T. Publications

- **Design specifications**
  - **Civil Engineering**
  - Electrical Engineering
  - Mechanical Engineering
- Books & Technical reports
- Proceedings

Design Codes: Civil Engineering

- Design Loads
- Construction Material
- **Steel Structures**
- Concrete Structures
- Code of Standard Practice
- Construction Safety
- Inspection & Maintenance

EIT's Code Development Methodology

- Referral Standards
- Development Procedure
- Problem and Difficulties
- Direction

Referral Standards for Civil Engineering

- Materials
  - Thai Industrial Standard (TIS)
  - Others: JIS, ASTM, BS, DIN, AS
- Design Specifications
  - ACI, AISC, AASHTO, and other American codes (99%)
  - JSCE, Eurocode

Procedures for Development of Design Codes

1. Nomination of code for development from subcommittee
2. Approval of E.I.T.'s Board of Director for drafting including content, budgeting
3. Appointment of Permanent committee & Drafting/Revision committee
4. Drafting
5. Public Technical Hearing
6. Publish the Design Codes
7. Arrange seminar and training for engineers

Problems and Difficulties

- Incomplete arrays of standards
- Mostly for educational usage, not for serious engineering practice
- Lack of strong financial support
- Drafting committee members are working on voluntary basis [very very slow]
- Relatively small number of practicing engineers [lacks economy of scale]

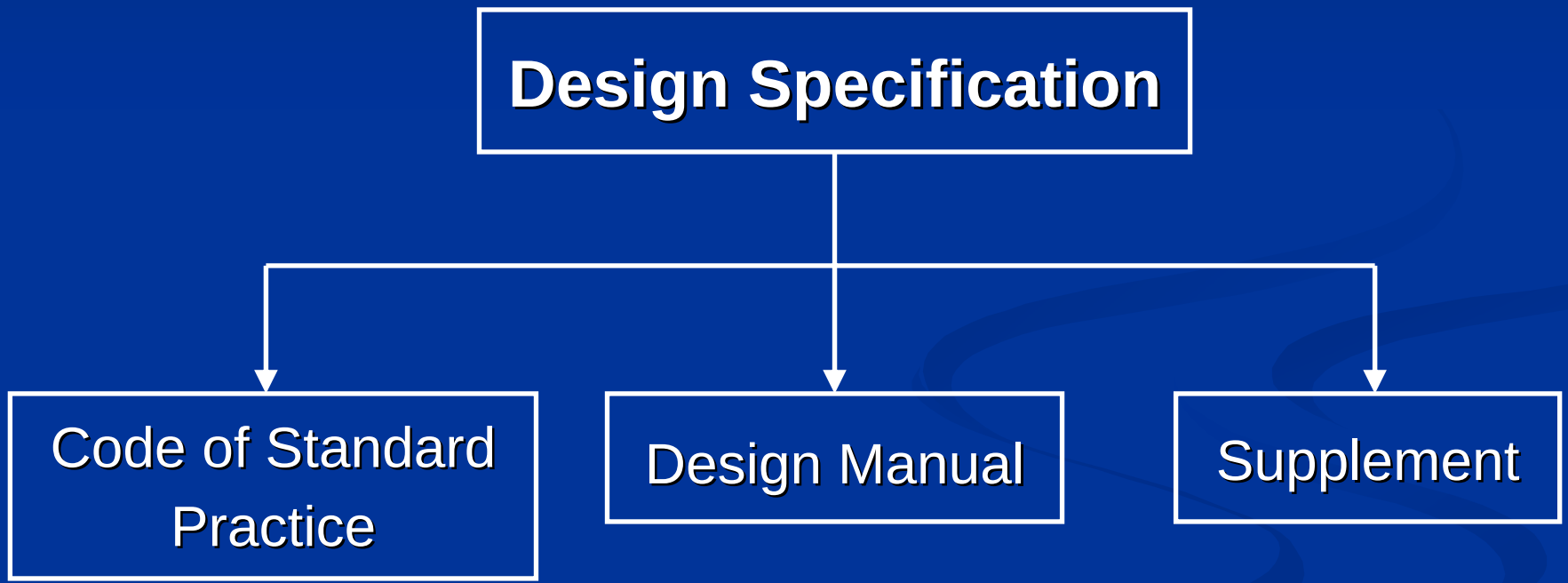
Direction

- Complete arrays of design codes
- Incorporate research results or findings
- Design codes that suit local practices

Development of Design Codes for Steel Structures

A Case Study

Structure of E.I.T. Design Specification



Design Codes: Steel Structures

Existing specifications

- Specification for Structural Steel Buildings: Load Resistance Factor Design (LRFD)
- Specification for Structural Steel Buildings: Allowable Stress Design (ASD)
- Design Specification for Cold-form Steel Sections,

Specification for Structural Steel Buildings: Load Resistance Factor Design (LRFD)

- Based on 2001 AISC's LRFD Code, published in 2002
- SI unit
- Current reference code for University courses and gaining popularity among practicing engineers

Specification for Structural Steel Buildings: Allowable Stress Design (ASD)

- Based on 1983 AISC's ASD Code, published in 1997
- Metric unit
- Reference design code for most engineers

Design Specification for Cold-form Steel Sections

- Based on a very old version of AISI's Code, published in 1985
- Metric unit
- Relatively unknown
- Urgently need revision for simplified version to suit the usage for small and secondary structure design (Design manual, table, chart)

Direction

- Needs supplemental standards such as material standard (steel, bolts), welding standard, connection design manuals, standard practice
- Member design manuals based on TIS steel sections
- Connection design manuals
- Revise load and strength factors
- Codes for design of specific structures (bridges and transmission towers)

Design Codes: Steel Structures

Specifications (under development)

- Manual of Steel Construction: LRFD
- Manual of Steel Construction: ASD
- Code of Standard Practice for Steel Buildings & Bridges
- Specification for Structural Joints using HS Bolts
- Guidelines for Welding Inspections
- Design of Hollow Sections
- Weathering Steel
- Fire Resistance

Harmonization of Design Codes

"Best approach of harmonization is to learn from the design codes of each other among ACECC members and understand the differences"

Barriers of Harmonization

- Language
- Referral standards (e.g. material standards, supplemental standards)
- Other technical issues
  - Philosophy and concepts
  - Loading
  - Geographical differences

Approach

- Direct adoption or partial adoption of design codes among ACECC members
- Promote dialogue among societies during code development (e.g. new JSCE's Bridge Design Code)
- Exchange of information
- Create a consortium for development