IPHA ANNUAL CONFERENCE
September 2003

FIB recommendations
Precast prestressed hollow core floors

AAD VAN PAASEN
VBI RESEARCH & DEVELOPMENT
FIB

The International Federation for Structural Concrete (fib - fédération internationale du béton) is a non-profit organisation created in 1998 from the merger of the Euro-International Concrete Committee (CEB - Comité Euro-International du Béton) and the International Federation for Prestressing (FIP - Fédération Internationale de la Précontrainte).
The objectives of fib as given in the statutes are to develop, at an international level, the study of scientific and practical matters, with the purpose of advancing the technical, economic, aesthetic and environmental performance of concrete construction.
These objectives will be achieved by:

- the stimulation of research,
- the synthesis of findings from research and practice,
- the dissemination of the results by way of publications, guidance documents and the organisation of international congresses and symposia,
- the production of recommendations for the design and construction of concrete structures,
- the information of members on the latest developments.
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Organisational structure

General Assembly
Council

President
Presidium

Steering Committee

Secretary General

Commissions + Special Activity Groups

Task Groups + Working Parties

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FIB Commissions
C 1 Structures
C 2 Safety and performance concepts
C 3 Environmental aspects of design and construction
C 4 Modelling of structural behaviour and design
C 5 Structural service life aspects
C 6 Prefabrication
  T 6.1 Prestressed hollow core floors
  T 6.2 Connections
  T 6.4 Precast bridges
  T 6.5 Precast concrete railway track systems
C 7 Seismic design
C 8 Concrete
C 9 Reinforcing and prestressing materials and systems
C 10 Construction

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FIB Commission
C 6 Prefabrication
  T 6.1 Prestressed hollow core floors
  Chairman: Aad van Paassen

Former publications:
- Precast prestressed hollow core floors
  Recommendation
- Quality assurance of hollow core slab floors
- Special design considerations for precast prestressed hollow core floors: Guide to good practice
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FIB Commission T 6.1 Prestressed hollow core floors

Aad van Paassen (Chairman)  The Netherlands
Arnold Van Acker  Belgium
Bruno Della Bella  Italy
Kim Elliott  United Kingdom
Gunnar Rise  Sweden
Spyros Tsoukantas  Greece
Sébastien Bernardi  France
Massimo Ferrari  Italy
Nordy Robbens  Belgium
Andrzej Cholewicki  Poland
Björn Engström  Sweden
Arto Suikka  Finland
Fritz Mönnig  Germany
Josef Hegger  Germany
Yoshihiro Murayama  Japan
Barry Crisp  Australia
Subbaiya Kanappan  India
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Content list (revised 2003-8-21)
  1. Scope of design
  2. Specific design principles
  3. Geometry
  4. Shear capacity on rigid and non rigid supports
  5. Flexural capacity
  6. Deflection
  7. Torsion
  8. Topping/composite action
  9. Punching
 10. Restrained supports
 11. Maximum point loads and line loads
 12. Transverse load distribution
 13. Dynamic actions
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Content list (revised 2003-8-21)
14. Vibrations and resonance
15. Diaphragm action
16. Horizontal loads
17. Large openings
18. Progressive collapse (will be deleted)
19. Fire resistance
20. Acoustic insulation
21. Connections
22. Fixings
23. Tolerances
24. Weepholes
25. Transport and lifting
26. Design considerations in connection with manufacture
Goal:
FIB recommendations will be published in 2005.
Three headlines
- Hollow core element and element qualities
- Quality design aspects
- Calculation methods
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Quality design aspects

Not only stress, load and span but also quality claims have to be considered, for example:
- measures to minimize the difference in camber,
- detailing of camber
- aesthetic of ceiling
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Quality design aspects
For a good quality of the ceiling:
- Max. slenderness is 38
- Level of prestressing is average
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Quality design aspects
For a good quality of the ceiling:
- Max. slenderness is 38
- Level of prestressing is average

For dwellings the max length of hollow core slabs are:

<table>
<thead>
<tr>
<th>Strength of element (mm)</th>
<th>Steel trimmer in house-building Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>7600  7400  6300  5200</td>
</tr>
<tr>
<td>none</td>
<td>1200 mm  2400mm  3600mm</td>
</tr>
</tbody>
</table>

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Quality design aspects
For a good quality of the ceiling:
- Max. slenderness is 38
- Level of prestressing is average

For offices in relation to the loads the max. length of hollow core slabs are:

<table>
<thead>
<tr>
<th>Strength of element</th>
<th>Industry and office building</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sprung ceilings</td>
</tr>
<tr>
<td>Additional load*</td>
<td>5,00 KN/m²</td>
</tr>
<tr>
<td>200</td>
<td>8000</td>
</tr>
<tr>
<td>260</td>
<td>11000</td>
</tr>
<tr>
<td>320</td>
<td>13000</td>
</tr>
<tr>
<td>400</td>
<td>15000</td>
</tr>
</tbody>
</table>

* Additional load = 1,50 KN/m² + live load
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Quality design aspects
For a good quality of the ceiling
For roofs:
- Max. slenderness is 45
- Level of prestressing is average

For roofs in offices in relation to the loads the max length of hollow core slabs are:

<table>
<thead>
<tr>
<th>Strength of element</th>
<th>Industry and office building</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sprung ceilings</td>
</tr>
<tr>
<td>Additional load*</td>
<td>2,00 KN/m²</td>
</tr>
<tr>
<td>150</td>
<td>8000</td>
</tr>
<tr>
<td>200</td>
<td>10000</td>
</tr>
<tr>
<td>260</td>
<td>12500</td>
</tr>
<tr>
<td>320</td>
<td>14500</td>
</tr>
<tr>
<td>400</td>
<td>18000</td>
</tr>
</tbody>
</table>

*: Additional load = 1,00 KN/m² + live load
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Quality design aspects:
Good prediction of camber after erection

Pre-stressing Camber (mm)
Light \(1,0 / 1000 \times \text{Element length} \leq 1/40 \times \text{Element height}\)
Middle \(1,5 / 1000 \times \text{Element length} \leq 1/20 \times \text{Element height}\)
Heavy \(2,5 / 1000 \times \text{Element length} \leq 1/10 \times \text{Element height}\)

Good prediction of camber during erection (A320)
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Quality design aspects

International directive of safety for
- Erection of hollow core floors
- Hoisting regulations
Hollow core floors must be:

a quality flooring solution
with good design recommendations