Special Activity Group 6

Composite steel-concrete construction

Convener:	**Pecce** (Univ. del Sannio, Italy)
Secretary:	Di Sarno (Univ. del Sannio, Italy)
Members:	**Corres** (FHECOR, Spain), **Cosenza** (Univ. di Napoli Federico II, Italy), Dezi (Univ. Politecnica delle Marche, Italy), **Eligehausen** (Eligehausen+Asmus, Stuttgart, Germany), **Faella** (Univ. di Salerno, Italy), Leskela (Univ. of Oulu, Finland), **Mancini** (Politecnico di Torino, Italy), **Mola** (Politecnico di Milano, Italy), Napoli (Politecnico di Torino, Italy), Nigro (Università di Napoli, Italy), Raoul (SETRA, France), Stucki (DIC s.a. ingénieurs, Switzerland), **Yamazaki** (Nihon Univ., Japan)
Recent Meetings:	Naples (Dec. 09)

Names of ***fib*** **members** are given **in bold**

Terms of reference

Special Activity Group 6 was formed to provide a comprehensive and up-to-date state of art of building construction technologies and design specifications for steel and concrete composite structures, including primarily bridges and buildings. Tunnel systems will also be investigated.

The group's activities will focus on the issues related to the construction, design and detailing of composite bridges and buildings, either portal frames or multi-storeys. Special issues related to composite tunnel constructions will also be considered.

The following topics will be addressed:

- composite beams and columns type: cross-section classification; effective widths of beams in framed systems, vertical and lateral response of concrete filled columns with rectangular hollow sections (RHS) and circular hollow sections (CHS), structural stability;
- composite slabs: solid and with steel profiled sheeting, precast systems;
- composite joints: stiffness, strength and rotation capacity, elastic and nonlinear modelling;
- connectors: type of connectors, full and partial interactions, testing;
- bond behaviour at the profile-concrete interface: friction and mechanical connectors;
- serviceability limit states: cross section stiffness, interaction, long-term effects;
- innovative materials: light weight concrete, high strength concrete, FRP rebars; high strength structural steel;
- methods of analysis: member and joint modelling, short and long term effects, e.g. creep and shrinkage, effects of cracking of concrete, response parameters:
  - linear elastic analysis: structural modelling;
  - non-linear analysis: non linear material modelling, bond mechanisms;
  - plastic analysis: plastic hinge rotation modelling.

Special problems:

- buildings
  - connections: base column-to-foundation, beam-to-column, brace-to-beams and brace-to-columns;
  - diagonal braces with structural steel cores;
  - braced frames: concentrically and eccentrically braced.
- bridges
  - buckling of members: geometric and mechanical imperfections, axial and lateral-torsional;
  - fatigue and fracture: welding process;
  - durability and maintenance: painting,
  - retrofitting: special metals, tendons, prestressing;

• tunnels
  - construction stages: short-term effects, propping;
  - composite panels: interface problems, steel-and-concrete interaction, stability in shear.
  - temperature effects.

The outcome of SAG6 should first be a state-of-art report illustrating the technologies available for the construction of composite steel and concrete buildings, bridges and tunnels. In a second step, design recommendations need to be provided to optimize the inherent benefits of composite structures.
