

Semester Project – BA/MA

Assessment of Reinforced Concrete Structures by *fib* Model-Code 2020

Didactical framework

- 5 ECTS BA semester project **OR** 8 ECTS MA semester project in Spring 2026
- 4 groups with 2 students per group. In each group at least 2 Elements are to be analyzed
- A final report is required with the main findings
- Supervisors: Dr David Fernández-Ordóñez (EPFL and *fib*) and Dr. Patrick Valeri (LMP and *fib*)
- Weekly meetings with Patrick Valeri (if possible, every Friday afternoon) and Email correspondence
- Final assessment with David Fernández-Ordóñez and Patrick Valeri
- The findings will contribute as a basis for an *fib* Publication thus students are actively participating in an *fib* Project

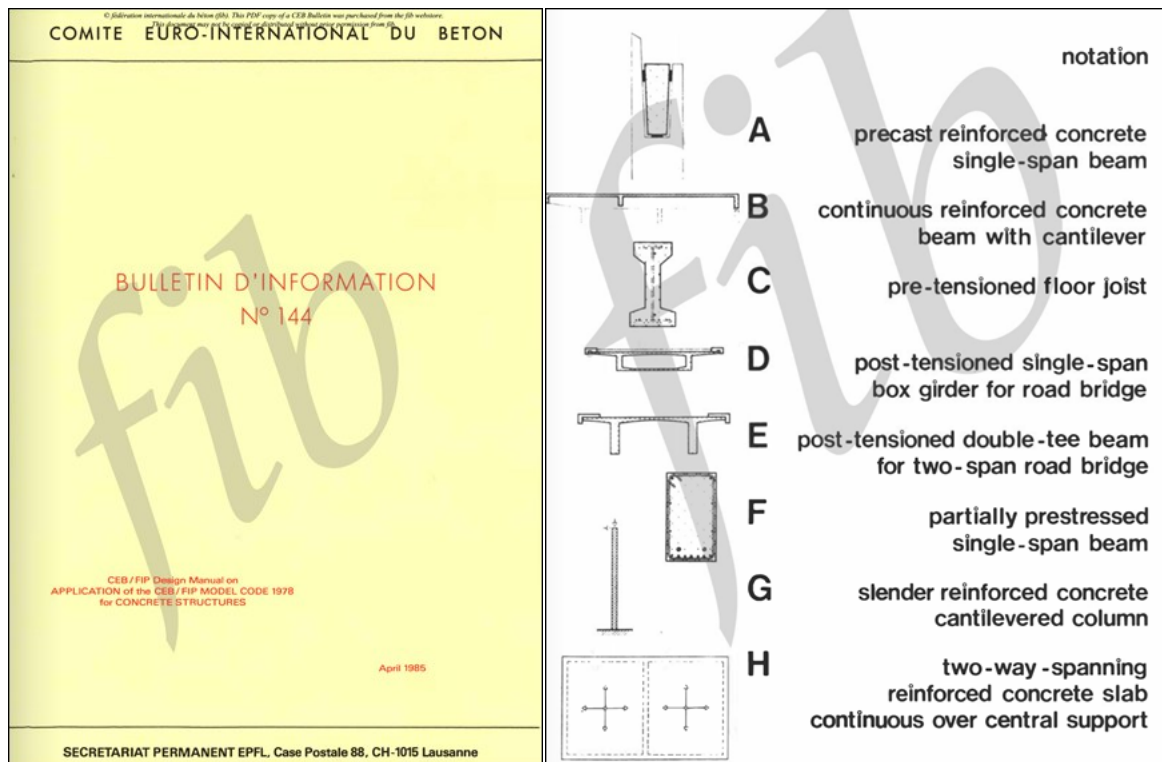
Project description

A significant share of the build environment is made of reinforced concrete. Countless buildings, bridges, tunnels, airports, and hydraulic infrastructure were built several decades ago and are now reaching the end of their first life cycle. At the same time, the current environmental challenges require a cautious consumption of raw materials. Thus, the renovation of existing structures is preferred to its replacement.

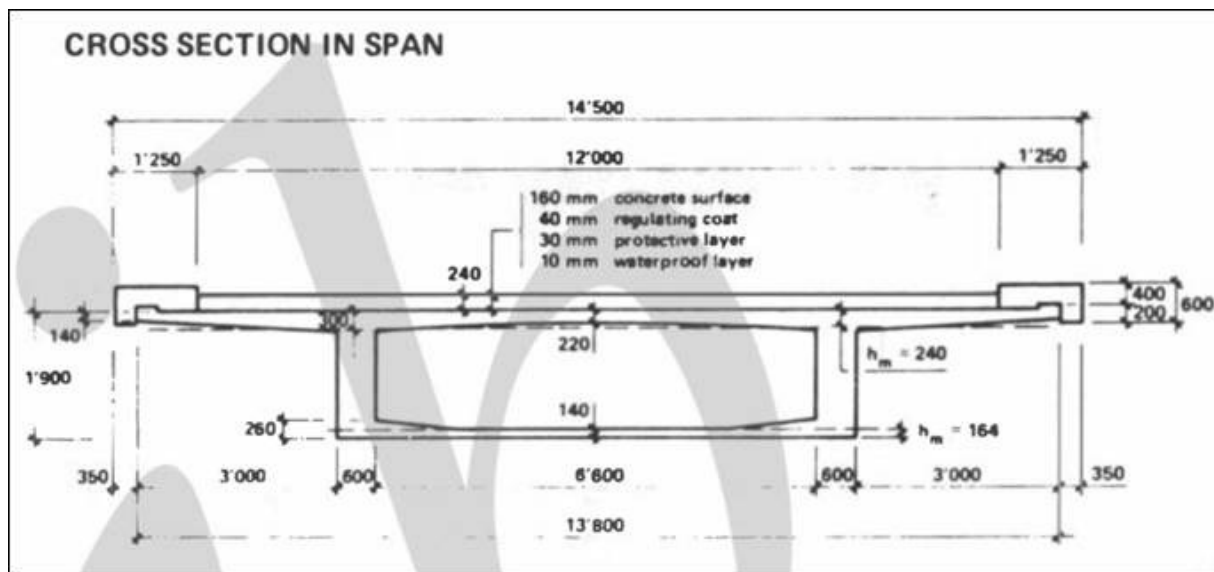
*A better understanding of the load-bearing mechanism in existing structures allows to design more cost-effective interventions when it comes to structural retrofitting. Several new concepts have been integrated in the latest generation of the *fib* Model Code 2020 that can give designers a sharp tool for the assessment of existing concrete structures. Different levels of approximation allow to plan more targeted solutions that can reduce retrofitting costs and minimize environmental footprints.*

*In this project, you will assess some structural elements designed according to Model-Code 1978 in the *fib* bulletin 144 with the new design tools of the *fib* Model-Code 2020. You are expected to use the different levels of approximation proposed by the Model-Code and make an assessment whether a structural retrofit is required. By conducting a performance-based comparison of past and current code prescriptions, we can gain insight into whether certain verifications have become more stringent than others and whether some types of elements are more critical than others. These differences will be documented and categorized to quickly identify the most crucial areas for structural verification. Following the analysis with different levels of approximation, cost-effective retrofits are to be designed to comply with current code prescriptions.*

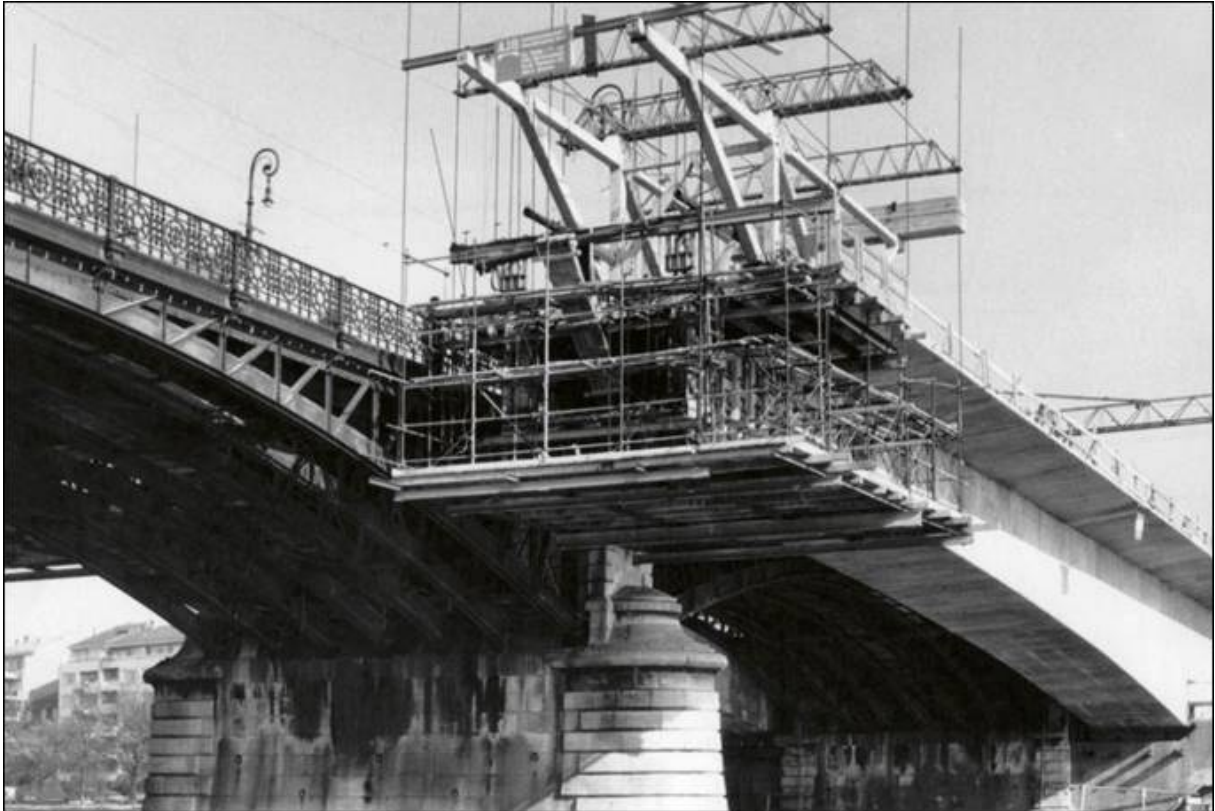
This work will allow you to gain a solid experience on the assessment of existing concrete structures. This skill is highly valuable for engineers entering the current work environment, since the number of interventions on existing structures is rapidly growing when compared to the new constructions.



Design examples of CEB-FIP Model Code 1978



Design example D: post tensioned box-girder for a road bridge



Construction of Johanniterbrücke, 1964-1967, Basel. Ingenieurbüro Schmidt.