Gérard-Philippe Zéhil

A Detailed Outline of my Professional Experience in Bridge Design & Construction

2006 — 2010 **ARTELIA ENGINEERING** – PARIS, FRANCE
Division of Transport and Infrastructure, Subdivision of Bridges
Bridge Engineering Project Manager

MAIN REFERENCES

- ✓ Project design of 300m tunnel for the B6 ramp on the A14/A86 highways' interchange in France. Main project aspects: civil engineering of cut and cover constructions; actively anchored and impermeable diaphragm walls; dewatering; significant earth cover loads on structures; ventilation plant; electrical substation; water treatment and pumping station; emergency exits; structural fire resistance; anti-recycling walls and noise barriers,

- ✓ New bridge doubling the existing viaduct over the Loire river (785.20 m) on the A87 highway near the French town of Ponts-de-Cés:
  - contribution, as a technical consultant, to the design of a launched double girder steel-concrete composite solution of variable height,
  - contribution, as a technical consultant, to the detailed control of execution studies for a prestressed concrete box-girder solution of variable height constructed by means of a balanced segmental cantilever method. Distribution of spans: 50,4 – 8 x 85,1 – 54,0 m.

- ✓ 2.000m tunnel for the A6b highway in France: multiple cut and cover constructions were designed using steel girders coated with cast in place concrete, or alternatively using precast prestressed girders with a cast in place upper deck on sections supporting a heavy surface traffic. Lattice steel structures were used in other sections for the support of noise protection screens. The new horizontal supporting structures were designed to be connected to the vertical cantilever retaining walls of the existing highway trench. The project also included the construction of electrical substations, emergency exists, and sanitation tanks behind the existing side walls, as well as the design of necessary adjustments to the RD126 departmental road and its equipment at the surface. The project showed to be particularly complex and delicate, technically and organizationally.
  Accomplished missions as head of the technical « civil engineering » section: project design, consultation of construction firms, evaluation of tenders, and contribution to the detailed control of execution studies.

- ✓ Repair of a multiple prestressed girder bridge crossing the canal of Saint-Denis on the ring road of Paris in France, following an intense fire exposure. Accomplished mission: design and proposal of a repair solution followed by the submission of an offer,

- ✓ Bridge of the French town “Choisy-le-Roi”: road traffic bridge crossing railways with many constraints of geometry and interfaces.
  Monitoring of the following missions: feasibility studies, preliminary design, advanced project design, consultation of construction firms and evaluation of tenders,

- ✓ Term missions of technical expertise (Paris), including:
  - optimizing a deep foundation system for the abutments of the WATT bridge,
  - dynamic and fatigue analysis of a hinging system designed for the suspension of a new separating wall to the existing Einstein bridge,
  - evaluation of potential structural incidences of foundation settlements that resulted from the drilling of the SIAAP tunnel under the bridges of the ring road of Paris and under bridges #7 and #9 in Bercy (prestressed concrete box-girder bridges – steel and composite box-girder bridges).

- ✓ Exceptional bridge crossing the Trois Bassins ravine (French Réunion island): prestressed concrete box-girder bridge of variable height and of very large cross section, equipped with inclined transverse steel struts and built using a balanced segmental cantilever construction method. The bridge was equipped with extradosed prestressing cables (cable-stayed like) and required a complex dual (longitudinal and transverse) phasing as well as detailed fatigue studies and dynamic studies with respect to turbulent winds.
  Accomplished missions: continuation of the detailed control of execution studies and of the monitoring of works (as started with THALES E&C),

- ✓ Feasibility studies and preliminary design of bridges supporting a new Tram-Train itinerary on the French Réunion island: launched steel-concrete composite girder bridges and prestressed box-girder bridges to be built using the balanced segmental cantilever construction method. Bridges names: ravines des Lataniers (2 solutions) + ravine Grande Chaloupe (1 solution). Received the client’s congratulations and appreciations for the quality of studies,

- ✓ 200m tunnel covering the RN314 national road in the French Town of Puteaux.
  Accomplished missions: feasibility studies, preliminary design, advanced project design, consultation of construction firms, evaluation of tenders and detailed control of execution studies.
  Implementing the cover tunnel project showed to be a particularly challenging task to achieve within the very short time limits that were imposed and given the numerous interfaces with a projected trading room building spanning the covered road.
  Main challenges encountered on the technical level: the design of a deep foundation system to limit settlements, insuring the structural resistance of the tunnel against potential acts of terrorism resulting in blasts, insuring the structural resistance of the tunnel to fire using a specific formulation of polypropylene fibered concrete.

Received the congratulations of the French public establishment in charge of the development of the "Défense" region (EPAD) for the quality of the performed studies,

- ✓ Deconstruction of the "S" bridge on the RN314 national road in the French town of Puteaux: reverse order demolition, in a very congested urban area, of a prestressed concrete box-girder bridge originally built using a span-by-span in-situ casting on standard falsework method,

- ✓ Design competition (for an engineering mission) of a new bridge in the French town of Canapville on the A132 highway. The context of the projected structure is particularly complex: supporting ground of bad quality with a low bearing capacity and subject to large settlements (vases); the site is near the Touques French river and therefore subject to flooding; the region is in seismic zone; the prescribed road path has a very low longitudinal profile spanning a railway and a departmental road (RD677) crossing each other under the projected bridge (minimum traffic circulation height constraints); traffic interruptions are forbidden (building method constraints); sensitive environmental context (the water quality of the Touques river must preserved); very slender structure needed; competitive cost objective.

2005 — 2006 **THALES ENGINEERING & CONSULTING –** PARIS, FRANCE
Divison of Transport and Infrastructure, Subdivision of Bridges
Principal bridge design engineer

MAIN REFERENCES

- ✓ Exceptional bridge crossing the Trois Bassins ravine (French Réunion island): prestressed concrete box-girder bridge of variable height and of very large cross section, equipped with inclined transverse steel struts and built using a balanced segmental cantilever construction method. The bridge was equipped with extradosed prestressing cables (cable-stayed like) and required complex dual (longitudinal and transverse) phasing as well as detailed fatigue studies and dynamic studies with respect to turbulent winds.
  Accomplished missions: full control of detailed execution studies and monitoring of works.

- ✓ Cover structure over the eastern ring road of Paris, in the « Lilas – Fougères » sector: horizontal cover structures made of steel girders coated with cast in place concrete and precast prestressed girders with a cast in place upper deck. Cover structures are fully connected to side walls.
  Accomplished mission: detailed control of execution studies.

- ✓ Rescue bridge crossing the Arles canal in the French town of Port de Bouc. The bridge leads to the Liquified Natural Gas (LNG) Terminal of FOS-CAVAOU city, in France. Client is the French natural gas company (Gaz de France):

- Main bridge: steel-concrete composite structure of 101m span made of lateral lattice (Warren type) steel girders brought on a barge navigating the canal and connected to a lower cast in place concrete slab,
- Access bridge: steel-concrete composite structure of 45m span made of multiple steel girders connected to an upper cast in place concrete slab,

Accomplished mission: contribution to the drafting of the project's technical specifications.

✓ Environmentally clean common transportation system of the Lorient-Lanester French town – « Orientis » interchange station.
Accomplished mission: design and sizing of two metallic awnings over walkways crossing eight large traffic lanes. Each awning has a surface grip of 35.40m x 9.15m.

2003—2005 **SECOA ENGINEERING -** PARIS, FRANCE
Bridge Design Engineer

MAIN REFERENCES

1- TECHNICAL ASSISTANCE TO PROJECT MANAGEMENT

✓ Preliminary design and advanced project studies and design of the Altiani town bridge crossing the Tavignano river on the French island of Corsica (prestressed concrete arch/portal bridge, with prestressed crutches),

✓ Advanced project design for the new bridge crossing the Hérault river in the French town of Gignac (prestressed concrete arch/portal bridge),

✓ Detailed control of the execution studies for the construction of the viaduct of Laize in France (launched steel-concrete composite structure, in a seismic zone),

✓ Expertise and renovation studies of a footbridge crossing at the Palaiseau-Villebon railway station in France. Client: Paris transportation systems' independent administration (RATP),

✓ Advanced project studies and design of the Relais bridge on the French RN20 national road (the bridge deck is made of steel girders coated with cast in place concrete),

✓ Advanced project studies and design of the Chelles bridge, crossing the Chelles water canal in France (steel-concrete composite structure; the bridge deck is made of lateral lattice (Warren type) girders connected to a lower concrete slab),

✓ Contribution to the detailed control of execution studies for a bridge crossing the French « la Sioule » river (prestressed concrete box-girder bridge built using a balanced segmental cantilever construction method),

- ✓ Advanced project studies for overpasses PS11 and PS12 on the eastern bypass of Roissy in France (prestressed concrete deck slab bridges, skew and curved).

2- DETAILED EXECUTION STUDIES, FOR CONSTRUCTION

- ✓ Exceptional bridge crossing the Trois Bassins ravine (French Réunion Island): prestressed concrete box-girder bridge of variable height and of very large cross section, equipped with inclined transverse steel struts and built using a balanced segmental cantilever construction method. The bridge was equipped with extradosed prestressing cables (cable-stayed like) and required complex dual (longitudinal and transverse) phasing as well as detailed fatigue studies and dynamic studies with respect to turbulent winds.
  Accomplished mission: eigenmode analysis and turbulent wind studies.

- ✓ Viaducts of La SAVANE on the French Réunion island: four prestressed concrete box-girder-bridges built using a balanced segmental cantilever construction method,

- ✓ Viaducts of La SAVANE on the French Réunion island: two steel-concrete composite bridges made of launched dual-steel-girders connected to a cast in place concrete top-slab,

- ✓ Lifting of 3 overpasses (PS69, PS71 and PS72) on highway A13 in France,

- ✓ Renovation of the OA2 bridge in the French town of Douchy les Mines, using additional prestressing,

- ✓ Reinforcement of the viaduct of Yonne in France, using additional prestressing,

- ✓ Technical studies of an alternative structural solution for an acoustic cover on highway A86, near the town of Colombes, in France,

- ✓ Open-frame underpasses OA1 and OA2 on the roundabout of Osny in France (skew and curved reinforced concrete open-frames),

- ✓ Expertise regarding a controversy on the loading capacity of an existing girder in a renovated building,

- ✓ Analysis of the horizontal loading distribution between structural bearings of the central corps of satellite S3 in the International Airport of Paris Charles de Gaulle.