Normandy bridge (1991 to 1993)

- **Project : Cable-stayed bridge to cross the Seine estuary between le Havre and Honfleur, (France).**

  Total length : 2 141 m for a total of 40 000 t of concrete.

  The bridge is built on two 214 m high pylons, each one supported by 28 piles. 52 other pile the access roads are added to those 56 piles.
  For the first time the distance between the two pylons reaches a record of 856 m.

Normandy bridge (1991 to 1993)

- **Realization : GIE consortium constituted notably of Bouygues and Campenon Bernard concrete supply**
- **Specifications :**
  - To obtain 60 MPa compressive strength at 28 days
  - To be able to demould as fast as possible
  - Apply the constraint
  - To build a segment every 2 or 3 days

  A 20 cm slump was used.

- **Admixtures :**
  - Formulation with 10,5 kg of **Chrysofluid GT** (super plasticiser) for 425 kg of cement (Water/Cement ratio = 0,35)
  - A formulation used for the pouring of the piles, using a sliding formwork
  - 500 t of **Chrysofluid GT** (super plasticiser) used
- **Resistances obtained :**
  - >60 MPa at 7 days ; 75 MPa at 28 days
  - The density of the concrete allowed an excellent resistance to sea water.

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Normandy bridge (1991 to 1993)

- **Project : Base plate pads of the pylons, 20 m in diameter and 3,7 m high which is prestressing in two directions, each one representing 1 300 m^3 of concrete.**

Normandy bridge (1991 to 1993)

ω Specifications :

- To obtain a concrete adapted to be poured during a period of 8 to 10 hours in a heavily reinforced section
- Ensure a good link between the successive layers of concrete while avoiding high pressures at the bottom of the mould (the setting of the first layer must happen before the end of the concreting)
- Limit the risks of cracking by respecting the differential heat of hydration at 20°C

ω Admixtures :

- **Chrysoplast 760** (plasticiser) at a dosage varying between 0,6% and 1,2% of the cement weight. This allowed the pouring of 1 300 m^3 of concrete while maintaining a good homogeneity for successive layers and respecting the specifications that were set.
- **Chrysotard CE** (set retarder), allowed high initial resistances, used also for the diagonal braces of the pylons where a set delay allowed a good bond between the different layers, necessary to obtain a perfectly homogeneous block of concrete.

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