

**Zeitschrift:** IABSE reports = Rapports AIPC = IVBH Berichte  
**Band:** 64 (1991)

**Artikel:** Construction of short prestressed concrete bridges in Japan  
**Autor:** Izumi, Mitsuaki / Miyachi, Kiyoshi  
**DOI:** <https://doi.org/10.5169/seals-49316>

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## Construction of Short Prestressed Concrete Bridges in Japan

### Construction de ponts courts en béton précontraint au Japon

### Bauverfahren für Brücken kleiner Spannweite in Japan

**Mitsuaki IZUMI**

Prof. Dr.  
Meijo Univ.  
Nagoya, Japan

**Kiyoshi MIYACHI**

Chairman of Investigation Committee  
Japan Prestressed Concr. Contr. Assoc.  
Tokyo, Japan

#### 1. Historical Background

In the early 1950's, during the rebuilding era after the Second World War, the first Prestressed Concrete (PSC) Bridge was constructed in Japan. Thereafter, PSC Bridge construction has increased rapidly, with the growth of economical activities, as shown in Fig.1. The total number of PSC Bridges constructed has reached more than 7000 per year. During this period, total PSC Bridge construction sales have also increased except during the oil crisis periods. As shown in Fig.2, the total PSC Bridge construction sales reached the equivalent of two billion US dollars in 1989. Approximately 95 percent of the total PSC Bridges constructed and approximately 85 percent of their sales have been those of medium to short span bridges.

#### 2. Development in Construction Techniques

Great progress in construction techniques and equipment for PSC Bridges has been made since the first PSC Bridge was built. The PSC Bridge construction methods used in Japan are generally the scaffold, crane erection, and/or girder erection method depending on the construction site condition.

Moreover, in special cases, balanced cantilever erection, incremental launching, or moving scaffold systems have been increasingly employed for PSC Bridge construction, as shown in Fig.3. These systems are chosen according to the specific site condition. For example, the construction must be carried out over a road with heavy traffic or on high rise piers, these systems are safe, economical, and time saving. In addition, specific construction systems for Arch and Truss structures were developed.

For construction management, personal computer systems have been successfully employed on the job site since approximately ten years ago.

#### 3. Future Technological Trends in Construction

Future technological construction trends will be as follows, due to the rise labor costs and, subsequently, the employment of less labor intensive techniques:

- 1) Employment of factory made precast segments,
- 2) Employment of design and construction robots,
- 3) Development of rational energy-saving maintenance.

These factors will contribute to high quality and greater economy in construction and maintenance.

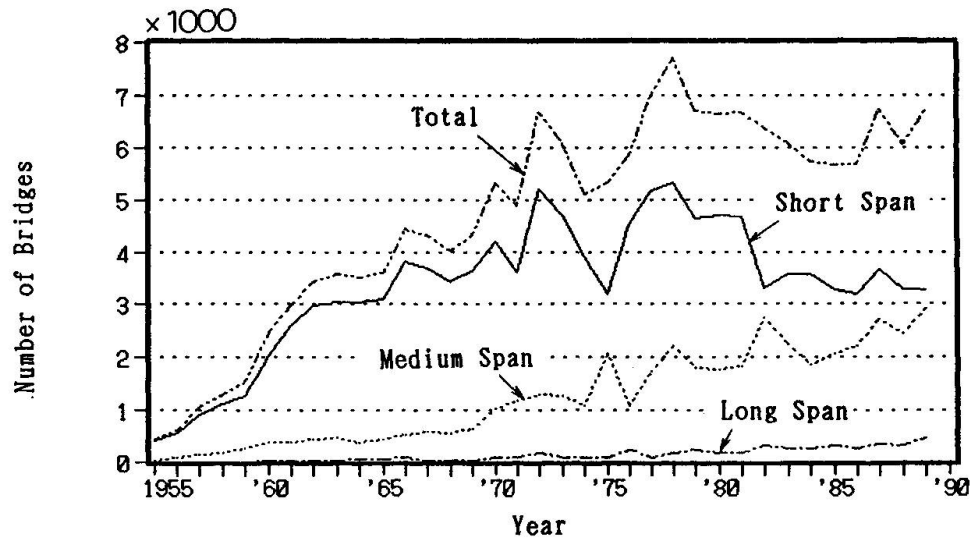


Fig. 1 Number of PSC Bridge Construction

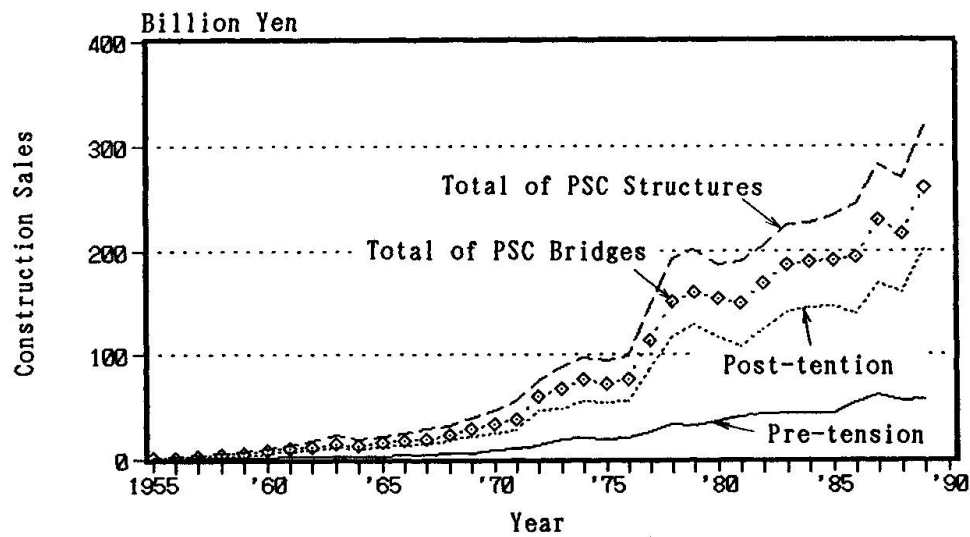


Fig. 2 PSC Bridge Construction Sales

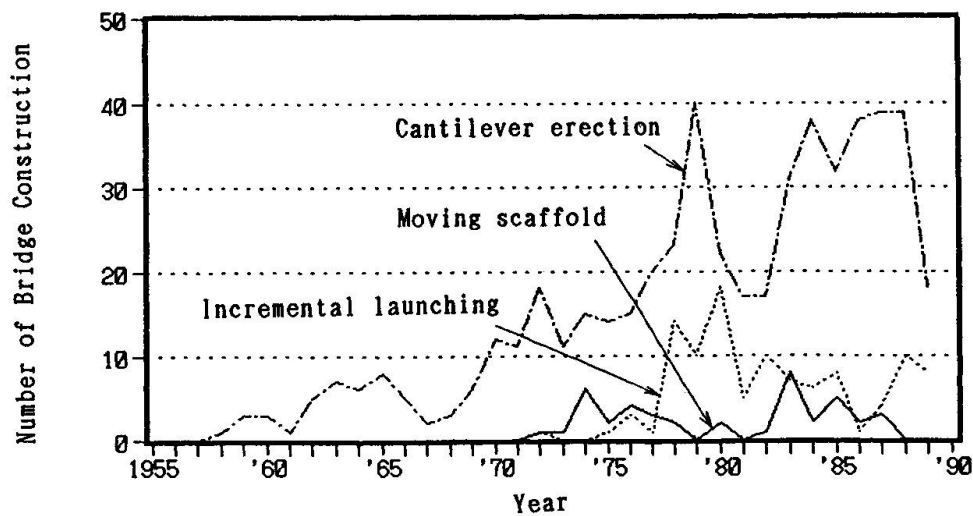


Fig. 3 Special Construction Systems for PSC Bridge