Introduction

For the last years an intense road network development program has been carried out in Poland. For the past three years more than 1000 km of new motorways and expressways have been built. More than 500 km are under construction.

A rapid development of urban road infrastructure, especially after 2004 when Poland accessed European Union, has resulted in construction of many...
Motorways and expressways in Poland
The biggest rivers in Poland

- Vistula River
- Odra River
Arch bridges bridge over the Vistula River in Puławy
Large span bridges in Poland

Bridge over the Vistula River in Puławy

Completed in 2008

Characteristics:
- Part of the ring road of Puławy along the S12 expressway;
- Continuous 14-span structure with a total length of 1038 m;

Radom

29.25

212.00

Lublin

56.00 64.00 64.00 64.00 64.00 64.00 64.00 80.00 10.29

Total length Lc = 1038.20
- steel-concrete composite deck;
- tie beam: four plate girders of constant height of 3.00 m grouped in two tandems;
- two arch girders with a rhomboidal box cross-section.
Large span bridges in Poland

Bridge over the Vistula River in Puławy

Design: Pomost Warszawa

Construction of the bridge in Puławy
Largest span bridges in Poland
Bridge over the Vistula River in Puławy

Monitoring system

LEGENDA:
- F - punkt pomiaru silny w wieszakach (10 szt.)
- T1 - punkt pomiaru przenieszenia kątów
   (6 szt. - Wierzchowin, 2 szt. - Południe)
- A1 - punkt pomiaru prędkości i kierunku wiatru (2 szt.)
- T2 - punkt pomiaru temperatury konstrukcji (36 szt.)
- T3 - punkt pomiaru wilgotności zębatych (44 punkty)
- S - punkt pomiaru osadzeń (24 punkty)
- A - punkt pomiaru przekształcenia
  (6 szt. - Kilakówka; 12 szt. - otaczające)
- CGD - moduł pomiarowo-agregat (2 szt., 1-kanałowy)
- BD - czujnik do pomiaru opadów atmosferycznych (1 szt.)
- TH - termometr (1 szt.)
- An - czujnik do pomiaru prędkości i kierunku wiatru (1 szt.)
- VS - czujnik wiatru (1 szt.)
- W - stacja pogodowa (1 szt.)
- V7 - punkt dziesięcioosiowy (2 kamery)
- VA - moduł awaryjny (2 szt.)
- EN - przyciski energetyczne
- ZN - znaśnik zmiennej treści (2 szt.)
Arch bridges over the Vistula River in Toruń
Large span bridges in Poland

Bridge over the Vistula River in Toruń

Completed in 2013

Characteristics:
- part of the newly designed section of the national road DK1;
- right riverside and left riverside multispan steel-concrete flyovers with a total length of 1330 m;
Large span bridges in Poland

Bridge over the Vistula River in Toruń

Cross section
- deck: steel orthotropic plate with a total width of 24 m, height of 3.0 m;
- concrete bases of the arches;
- steel arch girders with hexagonal box
Construction of the bridge in Toruń
Construction of the bridge in Toruń
Bridge over the Vistula River in Toruń
Details of the bridge in Toruń
Solidarity Bridge in Płock

Cable-stayed bridges
Large span bridges in Poland
Solidarity Bridge over the Vistula River in Płock

Completed in 2005

Characteristics:
- Main bridge is a cable-stayed structure suspended by a single plane of stays to two pylons, with the main span of 375 m and four back spans;
- Deck is a three-cell steel box girder with a constant height of 3.56 m and seven pairs of harp-arranged cables;
- Steel pylons with a height of 63.7 meters are fixed in the deck;
Large span bridges in Poland
Solidarity Bridge over the Vistula River in Płock

Drobin
SIDE VIEW

615.00 m
1200.00 m

2 x 60.00
3/5.00
2 x 60.00
10 x 58.50
63.70

Kutno

CROSS-SECTION

7.115

13.02

7.115

27.25 m

Side view and cross-section in the bridge in Płock
Large span bridges in Poland
Solidarity Bridge over the Vistula River in Płock

Construction of the bridge in Płock
Large-span bridges in Poland

Solidarity Bridge over the Vistula River in Płock

Construction of the bridge in Płock
Large span bridges in Poland

Solidarity Bridge over the Vistula River in Płock

Fixed spherical bearing \( V = 110 \text{MN}, \varnothing = 2.5 \text{m} \)
Large span bridges in Poland
Solidarity Bridge over the Vistula River in Płock

Load test 2005/10/22
Large span bridges in Poland

Solidarity Bridge over the Vistula River in Płock

View of completed bridge
Large span bridges in Poland
Solidarity Bridge over the Vistula River in Płock

First bridge with monitoring system
Cable-stayed bridges

Rędzinski Bridge in Wrocław
Large span bridges in Poland

Rędziński Bridge in Wrocław
Large span bridges in Poland

Rędziński Bridge in Wrocław

(completed in 2011)

Flyovers:
- South Flyover:
  - Total length: 610 m,
  - 11 spans: 40 + 2 x 52 + 56 + 6 x 60 + 50 m,

- North Flyover:
  - Total length: 520 m,
  - 9 spans: 50 + 7 x 60 + 50 m,
  - Continuous box structures, prestressed concrete.

Main Bridge:
- Cable Stayed Concrete Structure, total length: 612 m.
**Basic characteristics of the main bridge**

- **Total length:** 612 m,
- **4 spans:** 49 + 2 x 256 + 49 m,
- **Separate decks,**
- **4 planes of cables (160 stays),**
- **Single H-shaped pylon (height: 122 m).**
Cross section of the deck

Precast side panels

Reinforcement of bottom plate and webs

Stays anchorage zone
Rędziński Bridge in Wrocław
Construction of the bridge
Rędziński Bridge in Wrocław
Construction of the bridge
Construction of the bridge

Rędziński Bridge in Wrocław

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Construction of the bridge
Rędziński Bridge in Wrocław

Construction of the bridge
Rędziński Bridge in Wrocław
Construction of the bridge
Views of completed bridge

Design:
Research & Design Office
Mosty-Wrocław
Large span bridges in Poland
Rędziński Bridge in Wrocław

View of completed bridge
Rędziński Bridge in Wrocław

Monitoring system

Legend:
- LC - load cell (80 sensors)
- IC - inclinometer (10 sensors)
- TG - translation gauge (4 sensors)
- WS - anemometers and wind vane (2 sensors)
- TM - structure temperature gauge (22 sensors)
- CO - strain gauge (14 sensors)
- CA - accelerometer (28 sensors)
- CGD - data acquisition unit
- EN - supply network
Bridge over the Vistula River in Kwidzyn

Cable-stayed bridges
Bridge characteristics:
- bridge along DK90 road, connecting Kwidzyn with A1 motorway;
- prestressed extradosed concrete structure;
- main bridge: six span continuous beam, span lengths 69.3 + 130.0 + 204.0 + 204.0 + 130.0 + 70.0 m;
- external tendons (75 x 7Ø5 mm type) deflected in saddles and anchored in cross-beams on both sides of the girder.
Large-span bridges in Poland

Bridge over the Vistula River in Kwidzyn

Cross-section near the pylon

Section-by-section construction of superstructure
Design: Transprojekt Gdański

Views of completed bridge in Kwidzyn
# Large Span Bridges in Poland

## Conclusions

<table>
<thead>
<tr>
<th>Type</th>
<th>Name</th>
<th>Main span [m]</th>
<th>Material Arch (Pylon) / Deck</th>
<th>Completed</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch bridge</td>
<td>Bridge over the Vistula River</td>
<td>270.0</td>
<td>steel / steel</td>
<td>2013</td>
<td>Toruń</td>
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<tr>
<td></td>
<td>John Paul II Bridge over the Vistula River</td>
<td>212.0</td>
<td>steel / composite</td>
<td>2008</td>
<td>Puławy</td>
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<td></td>
<td>Kotlarski Bridge over the Vistula River</td>
<td>166.0</td>
<td>steel / steel</td>
<td>2001</td>
<td>Cracow</td>
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<tr>
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<td>Bridge over the Dziwna River</td>
<td>165.0</td>
<td>steel / composite</td>
<td>2003</td>
<td>Wolin</td>
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<tr>
<td></td>
<td>Bridge over the San River</td>
<td>150.0</td>
<td>steel / composite</td>
<td>2014</td>
<td>A4 motorway</td>
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<td></td>
<td>Bernatka Footbridge over the Vistula River</td>
<td>148.0</td>
<td>steel / steel</td>
<td>2011</td>
<td>Cracow</td>
</tr>
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## Conclusions

### Large Span Bridges in Poland

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<tr>
<td>Cable-stayed bridge</td>
<td>Solidarity Bridge over the Vistula River</td>
<td>375.0</td>
<td>steel / steel</td>
<td>2005</td>
<td>Płock</td>
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<td>Rędziński Bridge over the Odra River</td>
<td>256.0</td>
<td>concrete / concrete</td>
<td>2011</td>
<td>Wrocław</td>
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<td></td>
<td>Siekierkowski Bridge over the Vistula River</td>
<td>250.0</td>
<td>concrete / composite</td>
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<td>Warsaw</td>
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<td></td>
<td>3rd Millenium Bridge</td>
<td>230.0</td>
<td>concrete / composite</td>
<td>2001</td>
<td>Gdańsk</td>
</tr>
<tr>
<td></td>
<td>Bridge over the Vistula River</td>
<td>204.0</td>
<td>concrete / concrete</td>
<td>2013</td>
<td>Kwidzyn</td>
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<tr>
<td></td>
<td>Świętokrzyski Bridge over the Vistula River</td>
<td>180.0</td>
<td>concrete / composite</td>
<td>2000</td>
<td>Warsaw</td>
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</tbody>
</table>
LARGE SPAN BRIDGES IN POLAND

Conclusions

► The most common type of a large-span arch bridge in Poland is a tied arch with steel main girders and steel-concrete composite deck. There are few new concrete arch bridges, usually with shorter spans. Also upper deck structures, usually built over mountain valleys, are rare, as Poland is generally a lowland country.

► Among the large-span cable-stayed bridges the most common type is a structure with a steel-concrete composite deck suspended to a
THANK YOU FOR YOUR ATTENTION

D İNLED İĞİNİZ İÇİN TEŞEKKÜR ED ERİM