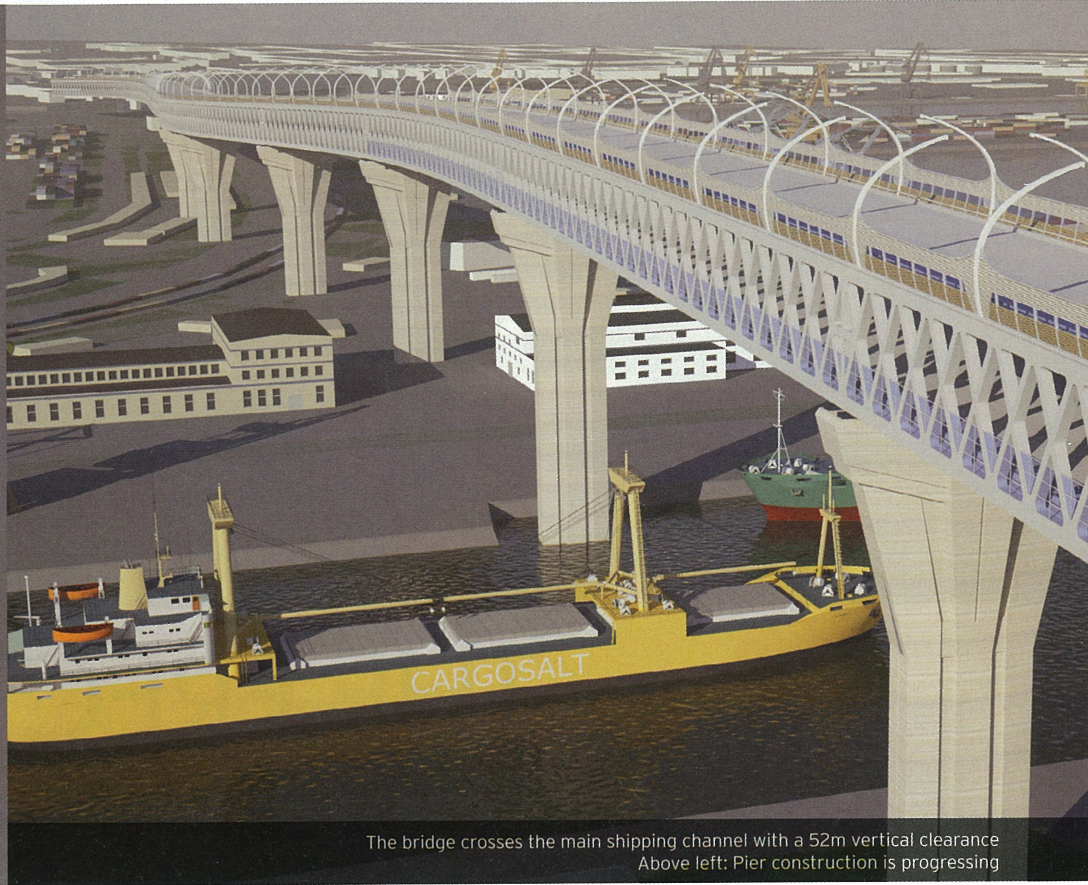


CLEVER CURVES



Launch of a major bridge in Russia is gearing up to start.

Richard Fish reports



The bridge crosses the main shipping channel with a 52m vertical clearance
Above left: Pier construction is progressing

One of the largest bridges presently under construction as part of the St Petersburg Western High Speed Diameter Road (see article page 32) is a 10m-deep truss with spans of up to 168m at a maximum clearance of 52m above the main shipping channel. The bridge has seven spans and is a total length of about 1km.

Planning for the deck erection is currently under way but the concept of launching the bridge from north to south has already been established. Not only is this a challenge in terms of the spans and weight of the superstructure but also in terms of geometry. Already on a vertical curve, the alignment is not straight and although the horizontal deviation is minimal, it is more than enough to generate significant eccentricities at pier locations.

Unsurprisingly, solutions to the engineering problems associated with such a launch, and dealing with eccentric loads, demand significant temporary works. That said, incremental launching enables most of the sites the bridge is to cross to remain unrestricted and open for the economic benefit to the city.

The basic launch system is to be one of winches and rollers, an early decision by contractor ICA. Although the principle may seem to be low-tech, contractor's representative, Mete Demir, prefers this solution: "Although there are issues of height above the channel and the overall geometry, there are no concerns about

using a simple but robust tried and tested system". ICA has appointed an international support team, including specialist bridge subcontractor M Ingegneria, to assist with the development of the methodology for the launch and to work closely with bridge designer, Stroy Proekt.

Whilst details are still being worked up, the emerging strategy is likely to establish an alignment of the truss during launching significantly higher than its final position. Each pier is to have a large temporary platform constructed above final bearing level and offset to allow for the temporary eccentricities needed to achieve the final horizontal alignment.

Temporary eccentric loads on the platform are in turn taken down to pile cap level through substantial braced props. Platforms are then to be loaded with steel rollers for both the launch nosing frame and the bottom chords of the truss as well as horizontal guide frames to maintain the launching alignment.

A traditional form of launch nosing will be fitted to the first fabricated truss section. Nosing rollers on the pier platforms are designed for multiple use: once the main truss is over a pier, they will be removed and fitted to the next pier in sequence.

But rather than having to extricate rollers from beneath the permanent truss, the present proposal is to change the connection from the pier to the nosing such that, as the launch progresses, the temporary rollers are

carried forward from the pier on the bottom chords of the nosing, greatly facilitating removal by crane back to ground level and on to next pier.

Managing the horizontal eccentricity by launching the bridge at a higher level and the effect of the vertical curve alignment creates another problem in that the truss spans need to be slightly longer in the temporary position than they do when jacked down to pier top level. This led to another innovative solution for the proposed launch: although truss spans are to be fabricated on a span-by-span basis, two temporary connections are to be installed at permanent expansion joint locations to increase the total length of the bridge during the launch.

Once the deck reaches its permanent position in plan the temporary connections will be removed. Further temporary supports are then to be erected centrally on each pier and the bridge jacked up so the rollers can be removed. Permanent bearing plinths and bearings are then to be built on the piers under the bottom chords of the truss before the deck is jacked down onto the bearings. At this point the gaps created by the removal of the temporary connections, will have closed and expansion joints can be fitted.

Although planning is still in progress, launching of a bridge of this size and at such a height will be a major undertaking and as spectacular an achievement as the finished bridge will be when completed ■