

The **Gateshead Millenium Bridge** spanning the river Tyne in England is a pedestrian and cycle bridge, instead of a stereotypical automobile bridge. The pedestrian/cycle pathway is a **horizontal parabola**, suspended above the river from a **parabolic arch**. The two parabolas are identical.

The drawing below shows the incomplete **elevation** and **plan** of the bridge in the rest state as shown in the photograph across.

- (a) Draw the plan of the pathway by inscribing a **parabola** in the given rectangle.
- (b) Draw the plan of the parabolic arch. Include the projections of nine cables.



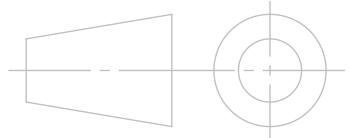
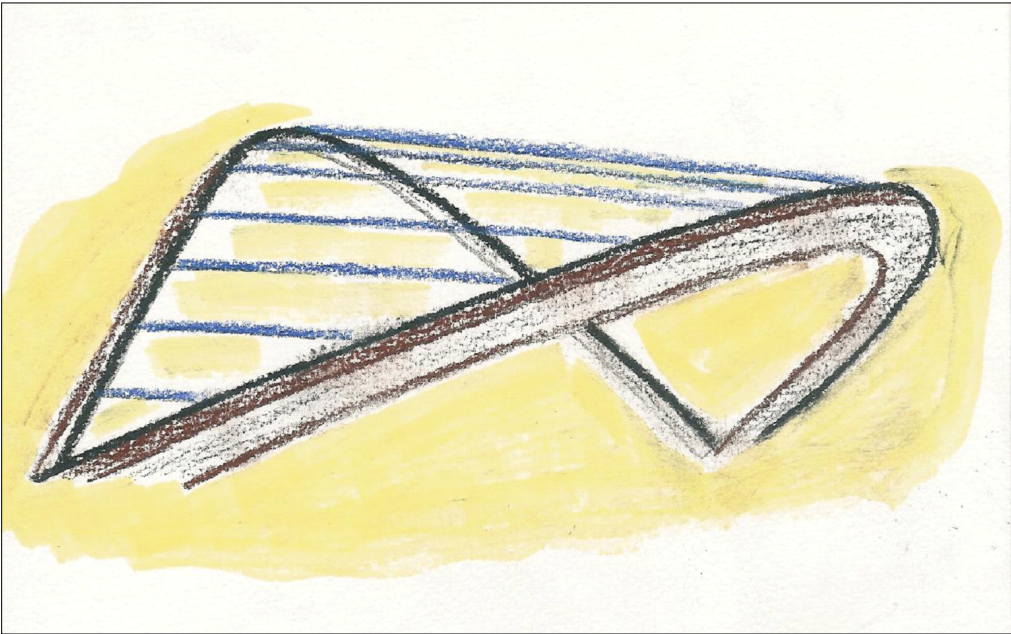
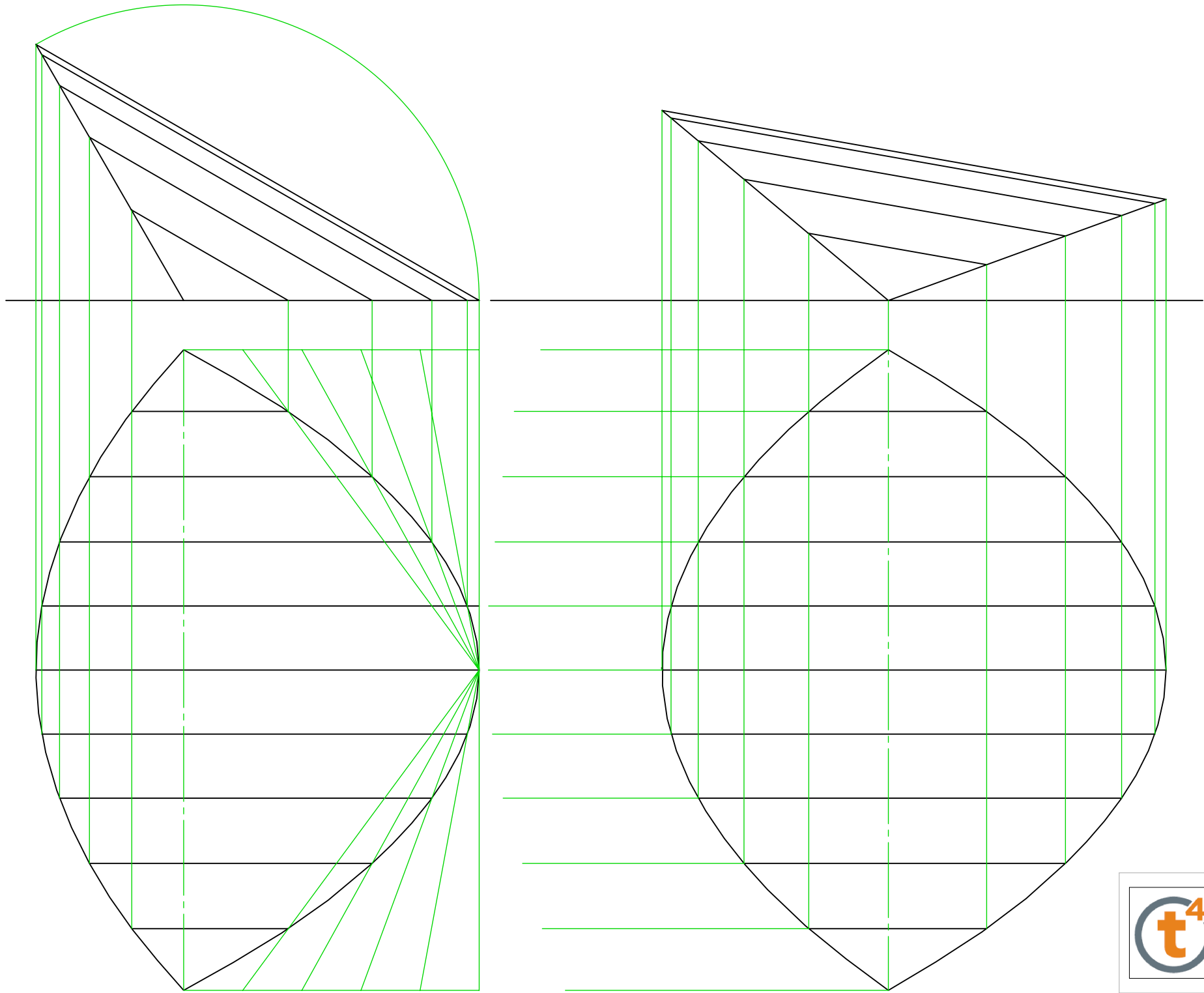
Key Principles:

- The hyperbola may be defined as the locus of all points the difference of whose distances from two fixed points (focal points) is a constant.
- The **asymptotes** pass through the centre and are tangential to the curve at infinity.

The whole bridge rotates as a single rigid structure as shown in the photograph below to allow boats to pass underneath. The geometry of the curves at each stage of the bridge's movement are superbly elegant.

Shown below is the complete **elevation** and incomplete **plan** of the bridge after it is rotated through 20 degrees.

Project a **plan** of the two parabolas in this position.



DESIGN & COMMUNICATION GRAPHICS

TITLE: **CONIC SECTIONS 7**

DRAWN BY: **SIZE A3** UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN mm

SCALE: **1:1** DATE: **26/01/2009** SHEET **1 OF 1**