

# Stressed ribbon bridge

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A **stressed ribbon bridge** (also stress-ribbon bridge or **catenary bridge**<sup>[1]</sup>) is a tension structure (similar in many ways to a simple suspension bridge). The suspension cables are embedded in the deck which follows a catenary arc between supports. Unlike the simple span, the ribbon is stressed in traction, which adds to the stiffness of the structure (simple suspension spans tend to sway and bounce). The supports in turn support upward thrusting arcs that allow the grade to be changed between spans (where multiple spans are used). Such bridges are typically made from concrete reinforced by steel tensioning cables. Where such bridges carry vehicle traffic a certain degree of stiffness is required to prevent excessive flexure of the structure, obtained by stressing the concrete in compression.

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## Two examples

The Maldonado bridge, or Puente de La Barra,<sup>[2]</sup> located in Maldonado, Uruguay, illustrated below, was created by the engineer Leonel Viera (1913-1975) to expand the area of Punta del Este. This pioneered the construction sequence now typical for concrete segment bridges of this type. After placement of the principal cables, precast concrete tiles were placed to form the initial structure. The cables were then prestressed by loading sandbags upon the tiles, followed by final concretization of the gaps between tiles. Removal of the sandbags then compressively stressed the concrete structure, enhancing its stiffness and durability under load. An identical bridge was later constructed parallel to the first.

## Stressed Ribbon Bridge



A stressed ribbon pedestrian bridge near Essing using a fabricated deck

<b>Ancestor</b>	Simple suspension bridge
<b>Related</b>	Suspension bridge
<b>Descendant</b>	None
<b>Carries</b>	Pedestrians, automobiles, trucks
<b>Span range</b>	Medium
<b>Material</b>	Steel rope, concrete or treated woods
<b>Movable</b>	No
<b>Design effort</b>	Medium
<b>Falsework required</b>	No



The concrete segment stressed ribbon footbridge shown below carries pedestrians, bicyclists, and pipelines across the Rogue River at Grants Pass, Oregon.<sup>[3]</sup>



## Notes

1. Leonardo Fernández Troyano, *Bridge Engineering: A global perspective*, Thomas Telford, 2003, ISBN 0-7277-3215-3, p. 514. (<https://books.google.com/books?id=0u5G8E3uPUAC&pg=PA514>)
2. Puente de la Barra de Maldonado (<https://structurae.net/structures/data/index.cfm?ID=s0002210>) at *Structurae*. Retrieved on 2009-12-07. 34.910904°S 54.872745°W
3. Rogue River Pedestrian Bridge (<https://structurae.net/structures/data/index.cfm?ID=s0005518>) at *Structurae*. Retrieved on 2009-12-07. 42.427115°N 123.346306°W

## References

- Strasky, Jiri (2006). "Stress Ribbon and Cable Supported Pedestrian Bridges" (PDF). Retrieved 2012-10-28.
- Strasky, Jiri (2005). *Stress Ribbon and Cable Supported Pedestrian Bridges*. London: Thomas Telford. ISBN 978-0-7277-3282-8.

## External links



- List of stressed ribbon bridges (<http://en.structurae.de/structures/stype/index.cfm?id=1046>), Structurae
- Structurae: Image of one of the two Maldonado stressed ribbon bridges (<http://en.structurae.de/files/photos/115/maldonado01.jpg>)
- Tourist article containing a reference to the above bridge (the Maldonado bridge) (<http://www.fulbright.org.uy/Western%20Hemisphere%20Conference/sightseeingspots.htm>)
- Spanish language site concerning the works of Don Leonel Viera (<http://arquitecto.com.uy/trobo/viera.php>)

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