



Braithwaite & Co. Limited

(A Govt. of India Undertaking)
Ministry of Railways

JSL 
JINDAL STAINLESS

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BRIDGING SAFETY FOREVER

With Stainless Steel Bridges

JSL : A LEGACY BUILT ON SAFETY & TRUST

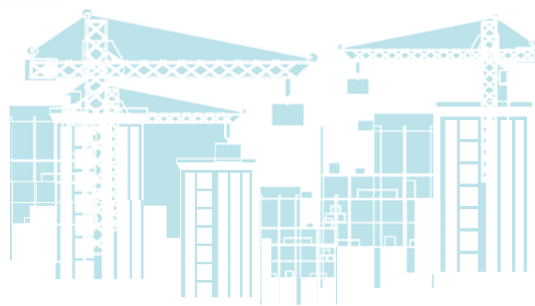
Founded by Shri O.P. Jindal in 1970, Jindal Stainless is one of the largest stainless steel conglomerates in India and ranks amongst the top 10 stainless steel conglomerates in the world. Jindal Stainless Group has an annual crude steel capacity of 1.9 MTPA and an annual turnover of \$3.4 billion (as on March'19).

Our growth has been backed by the excellence of our people, value driven business operations, customer centricity, adoption of one of the best safety practices in the stainless steel industry and a commitment for social responsibility.



BRAITHWAITE : A LEGACY SINCE 1930

Braithwaite & Co. Ltd (BCL), founded as a private company in 1930, was nationalized in 1976. It came under Ministry of Railways in 2010. Headquartered in Kolkata, it has three manufacturing units- Clive Works, Victoria Works and Angus Works- all located in West Bengal, with excellent infrastructure. Its areas of business include Wagons, Repair of Freight Cars, Structural Steelwork, Cranes and Steel Castings (Bogie & Coupler)



SOLID PARTNERSHIP - JSL AND BCL MOU

Aiming at its advent in structural infrastructure applications Braithwaite signed a Memorandum of Understanding (MoU) with Jindal Stainless to develop stainless steel foot-over-bridges(FOB), road-over-bridges(ROBs), etc. This MoU intends to fulfill Railways' vision and aspiration of world-class railway infrastructure in the country by synergizing the expertise of India's largest stainless steel producer, Jindal Stainless and Indian Railways' trusted fabrication expert, BCL. This collaboration comes at the right time as Railways is currently in the process of modernization on a massive scale. Jindal Stainless will be supplying stainless steel to BCL for developing FOBs on railway platforms, ROBs on municipal roads, smart city skywalks, road bridges and rail bridges.

STRENGTH TO PROTECT LIFE

Advantages of stainless steel FOBs over currently used IS 2062 material are:



Corrosion Resistance



Strength & Durability



Low Maintenance



Better Aesthetics



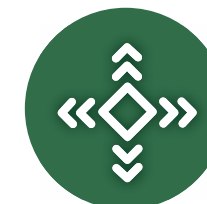
Weight Reduction



Increased Design Life



Sustainable - helps in reducing carbon footprint



Design Flexibility



Lower Lifecycle Cost

DESIGN FLEXIBILITY

CARBON STEEL:

The section type and structural configuration are influenced by the corrosion mitigation, thereby limiting the choices available to the designer while optimising the design.

STAINLESS STEEL:

In view of superior corrosion resistance, the structural engineer is free to select the most aesthetic and economical structural configuration with closed sections and any other combination, purely based on strength and serviceability parameters.

STAINLESS STEEL IN FOOT OVER BRIDGES (FOB)

Bridges, especially in coastal areas, are exposed to severe risk of collapse due to rapid corrosion. As per industry data, around 1,35,000 rail bridges exist in India, of which more than 25% are over 100 years old and need immediate replacement. The idea of using stainless steel to build sustainable infrastructure with optimizing lifecycle costs came into being for this very reason. Stainless steel has high impact resistance, does not get deformed and can absorb more energy during collision. This prevents loss of life during accidents and mishap. Easy design, fabrication and reduced life cycle cost give stainless steel an edge over any other metal. Additionally, the inherent properties of corrosion resistance, fire resistance, high strength-to-weight ratio, easy weldability and speed of construction and moreover low maintenance make stainless steel an ideal choice for any infrastructure.

HOWRAH BRIDGE

HOWRAH BRIDGE, the sixth-longest cantilever bridge in the world in 2013, is a suspension type balanced cantilever bridge, with a central span 1,500 feet (460m) between the centers of main towers and a suspended span of 564 feet (172m). Total structural works executed by Braithwaite- 26,500 tons.



VIDYASAGAR SETU

VIDYASAGAR SETU is a cable-stayed bridge, with 121 cables in a fan arrangement, built using steel pylons 127.62 metres (418.7ft) high. With a total length of 823 metres (2,700ft), Vidyasagar Setu is the second longest cable-stayed bridge in India. Total structural works executed by Braithwaite- 4510 tons.

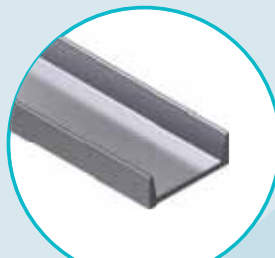


GANGA BRIDGE

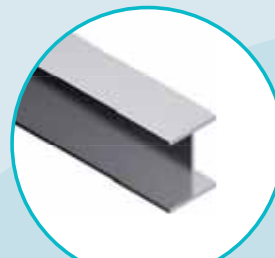
GANGA BRIDGE. The rail-cum-road bridge provides easy roadway and railway link between northern and southern parts of Bihar. This bridge of 19x123 m span triangulated steel bridge girders is the second longest rail-cum-road bridge in India. Total structural works executed by Braithwaite- 47480 tons.



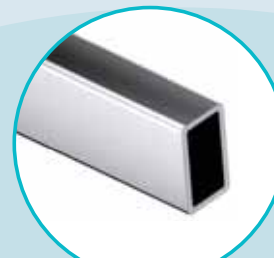
PRODUCT AVAILABILITY



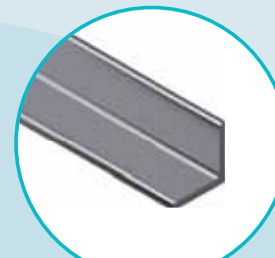
CHANNELS



BEAMS



HOLLOW SECTIONS



ANGLES

CHEMICAL COMPOSITION OF JSL DURASAFE

GRADE	A1010/IRS M-44/97 (M)/JSL DURA
% C	0.03 MAX
% MN	0.8 - 1.5
% SI	1.0 MAX
% S	0.03 MAX
% P	0.03 MAX
% NI	0.3 - 1.5
% MO	0.1 MIN
% CR	10.8 - 12.5
OTHERS	TI - 0.75 MAX

YIELD STRENGTH	350 MPA MIN
TENSILE STRENGTH	500 MPA MIN
ELONGATION	20 MIN
HARDNESS	180 (RB) MAX

INTERNATIONAL CODES

IRSM 44/97(M) similar to RDSO Specification IRSM 44/97 and CK-201X2CrNi12 suitably modified for structural application, ASTM A1010/A1010M-01e1 and Indian standard (IS)-6911-2017 (amendment 2) X02Cr12"

Prominent international codes for material, design and construction/fabrication code related to Stainless Steel structure construction are given below:

Material Codes	Corresponding Design codes	Corresponding construction/fabrication codes
EN 10088 (All Parts)	EN 1993-1-1 (General Design Rules), EN 1993-2 (Steel Bridges) & EN 1993-1-4 (Supplementary Rules for Stainless Steel)	EN 1090-2: Execution of steel structures (Technical requirements for steel structures) 1993-1-4 (Supplementary Rules for Stainless Steels)
ASTM A1010/A1010M ASTM A709/A709M ASTM A240	AASHTO LRFD Bridge Design Specifications	AASHTO LRFD Bridge Construction Specifications

MODERN CONSTRUCTION TECHNIQUES

The recent FOB accidents caused due to corrosion indicated that there is a need of modern construction technique using corrosion resistant Stainless Steel in coastal areas. The Ministry of Railways has taken a step ahead in constructions by commissioning stainless steel as the structure material for FOBs & ROB.

INDIA'S FIRST STAINLESS STEEL FOB TENDER BY WESTERN RAILWAYS

DYCE-C-I-CCG-ENGINEERING/WESTERN RLY TENDER DOCUMENT
Closing Date/Time: 22/07/2019 15:00

Tender No: DyCE-C-I-770

DyCE/C-I-CCG acting for and on behalf of The President of India invites E-Tenders against Tender No DyCE-C-I-770 Closing Date/Time 22/07/2019 15:00 Hrs. Bidders will be able to submit their original/revised bids upto closing date and time only. Manual offers are not allowed against this tender, and any such manual offer received shall be ignored.

Contractors are allowed to make payments against this tender towards tender document cost and earnest money only through only payment modes available on IREPS portal like net banking, debit card, credit card etc. Manual payments through Demand draft, Banker cheque, Deposit receipts, FDR etc. are not allowed.

1. NIT HEADER

Name of Work	Construction of 10m wide foot over bridge(stainless steel), dismantling/reconstruction of existing foot over bridge and other structures coming in alignment of foot over bridge on south side of Bhayander station, Mumbai Div. Western Railway.		
Bidding type	Normal Tender	Bidding System	Two Packet System
Tender Type	Open	Date Time Of Uploading Tender	20/06/2019 15:23
Tender Closing Date Time	22/07/2019 15:00	Pre-Bid Query Date Time	Not Applicable
Pre-Bid Required	No	Tendering Section	ESTIMATE
Advertised Value	111557340.75	Bidding Unit	60
Bidding Style	Single Rate for Each Schedule	Validity of Offer (Days)	12 Months
Earnest Money (Rs.)	767800.00	Period of Completion	Expenditure
Tender Doc. Cost (Rs.)	10000.00	Contract Category	Yes
Contract Type	Works	Are Joint Venture (JV) firms allowed to bid	Capital
Bidding Start Date	28/07/2019	Expenditure Type	
Ranking Order For Bids	Lowest to Highest		

EDGE AHEAD WITH JSL AND BRAITHWAITE



BRIDGES

Colusa Bridge



Image credits-<https://water.weather.gov>

Millennium Bridge



Image credits-<https://i.pinimg.com>

Rt 340 Bridge



Image credits-<https://www.virginiadot.org>

...AND MANY MORE

NOTES

The image features a decorative background. On the left and right sides, there are light blue wavy shapes that resemble stylized waves or clouds. The central area is white and contains horizontal lines, suggesting a space for text or a list. The overall design is clean and modern.[illegible]