

Stressing with Real Time Load to Installation the Stay Cable in the Brasilia Bridge

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Protende – Tensaccial Director, Protende – Tensaccial, Brazil

J K Brasilia bridge, panoramic view

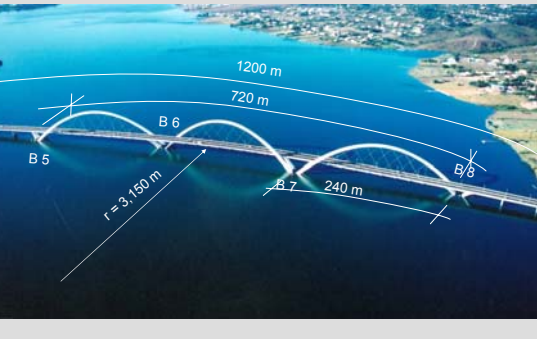


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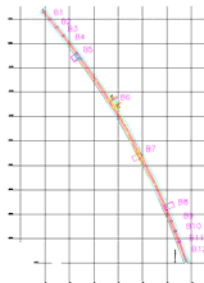
Summary

- Geometrical characteristic
- The stressing the stay cable during the installation and instrumentation plan
- Results and analysis
- Conclusions

The Brazilian Bridge – J K

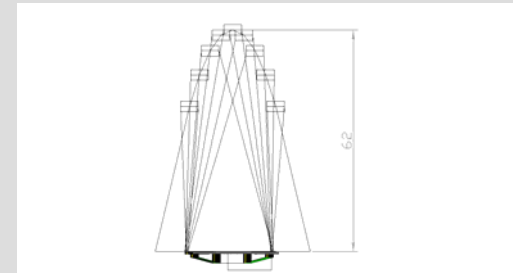


layout the bridge J K Brasilia Bridge



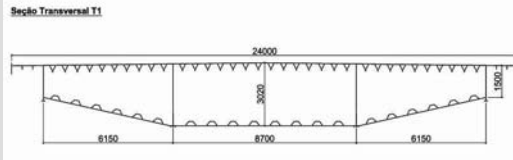
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schematic view of the arch

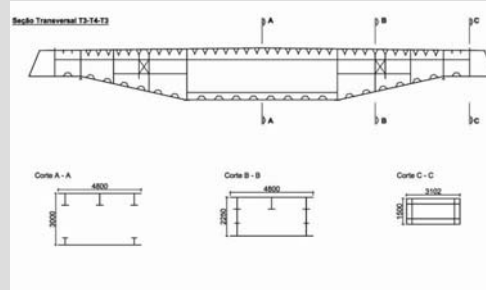


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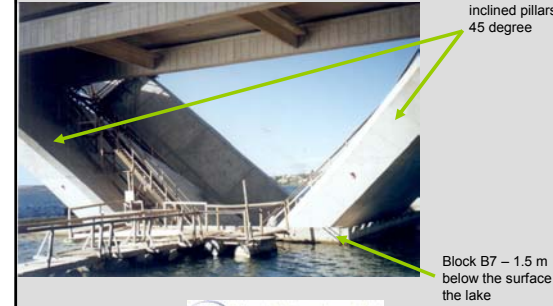
Cross section of the metallic deck, between the hanger



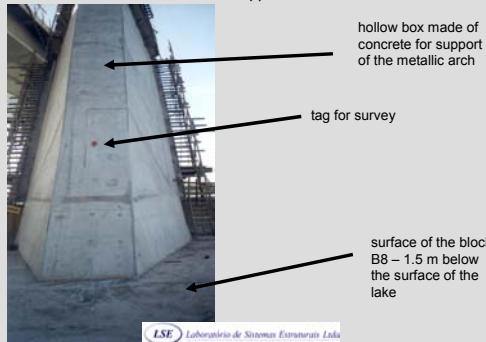
Cross section of the metallic deck on the hanger anchorage



concrete pillars for support of the steel deck – block B7



Clubes arch support – Block 8



hollow box made of concrete for support the steel arch



Metallic structures over the deck for the construction of the arches



Release the temporary metallic support after the arch closed



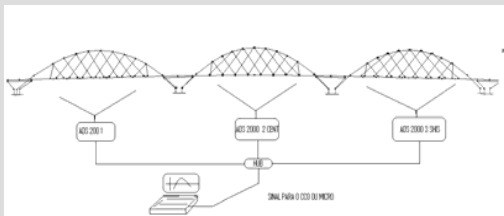
panoramic view of the arches construction



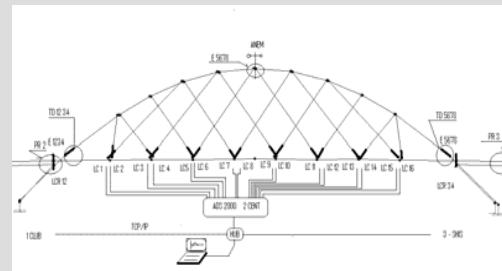
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Layout the instrumentation plan of three arches of the Brasilia Bridge



Layout of the instrumentation plan the Brasilia Bridge main span - central arch



panoramic view of the arch before the installation hanger



load cells for strand – setup phase



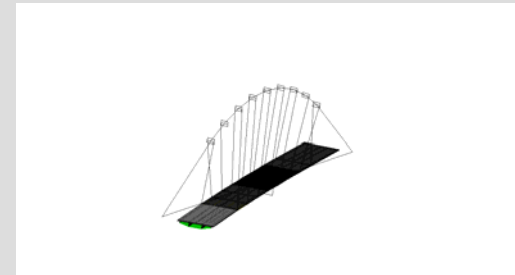
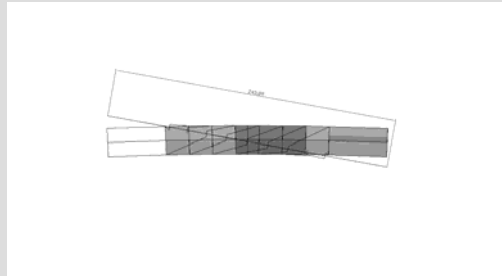
Phase a – 4 hangers in the central arch



Load cell on the anchorage



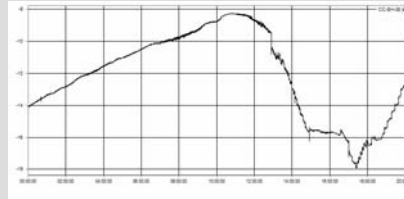
Phase b – more 4 hangers



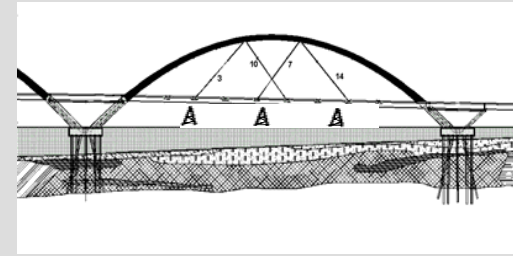
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Stay tensile during 24 hours

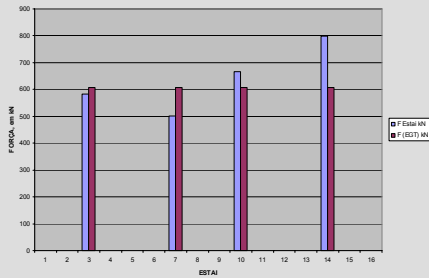


SHIS – phase a – 1a

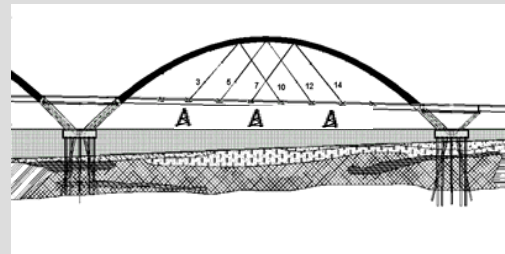


CLUBES – phase a

FORÇAS NOS ESTAIS - ARCO CLUBES - fase a

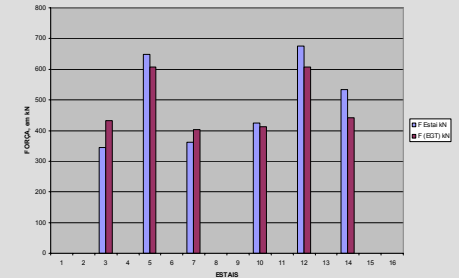


SHIS – phase b: 5-12

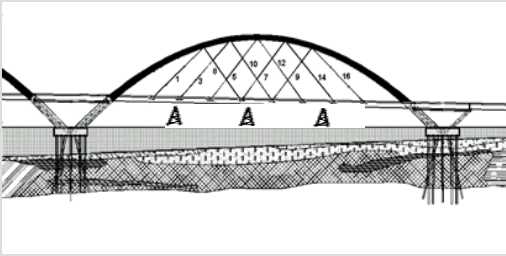


CLUBES – phase b

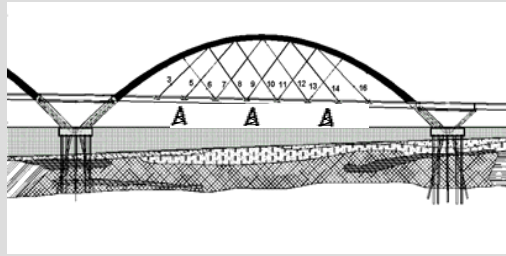
FORÇAS NOS ESTAIS - ARCO CLUBES - fase b



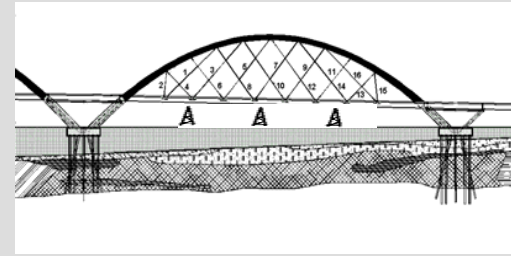
SHIS – phase c : 1-8; 9-16



SHIS – phase d : 6-11

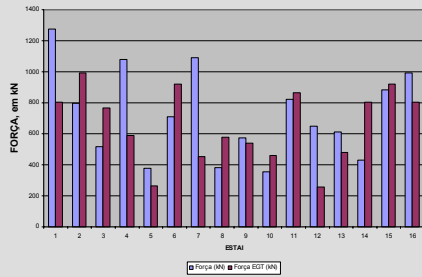


SHIS – phase e : 2-4; 13-15



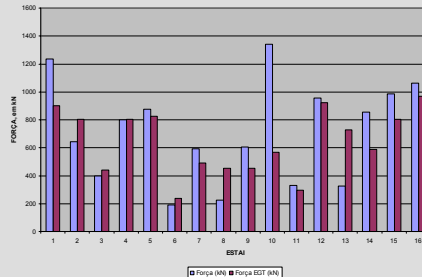
central arch

FORÇAS NOS ESTAIS - ARCO CENTRAL - 20 kN - 1a. ETAPA



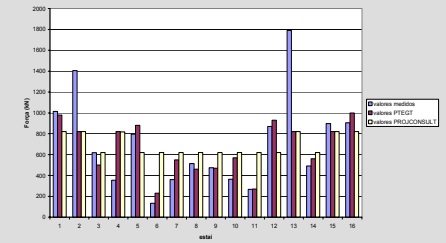
ARCO SHIS

FORÇAS NOS ESTAIS - ARCO SHIS - 20 kN - 1a. ETAPA



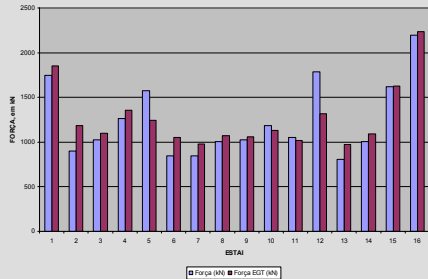
clubes arch – 20%

Arco Clubes - etapa 20% tensionamento



shis arch

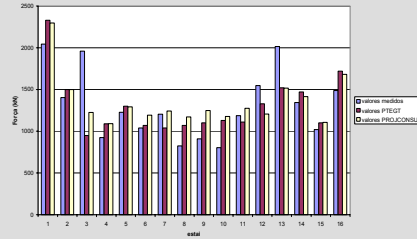
FORÇAS NOS ESTAIOS - ARCO SHIS - 80% - 3a. ETAPA



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clubes arch - 80%

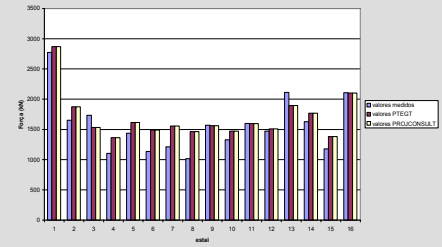
Arco Clubes - etapa 80% tensionamento



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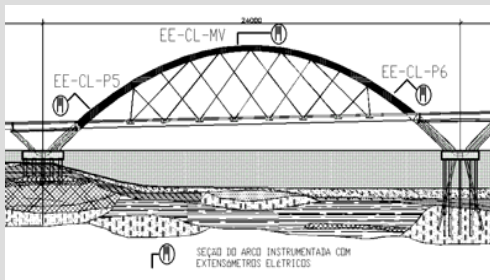
clubes arch - N_d 100%

Arco Clubes - etapa 100% tensionamento



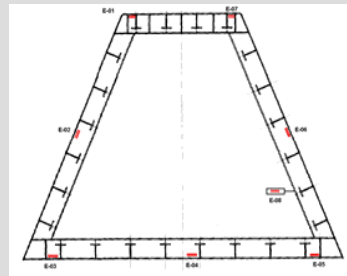
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strain gages instrumentation on the arch



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strain gages instrumentation



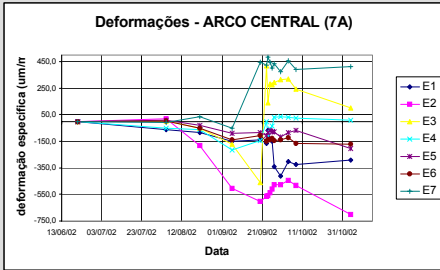
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details of the strain gages instrumentations

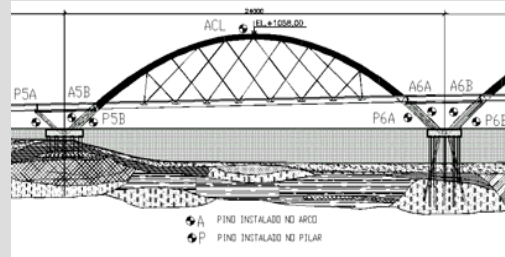


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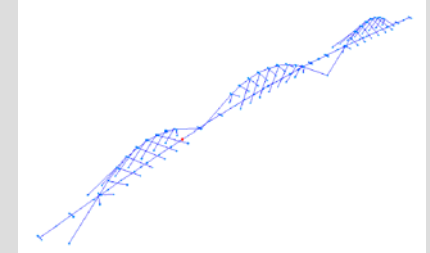
strains of the metallic arch - constructions phases



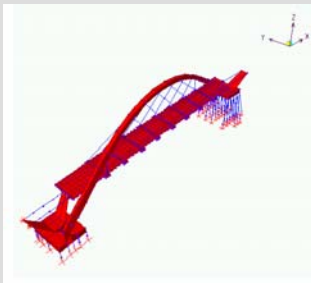
Survey – target



Numerical model – JK Bridge



Numerical model – JK Bridge



Brasilia Bridge – physical model



Panoramic view of the model



static testing on model



survey station



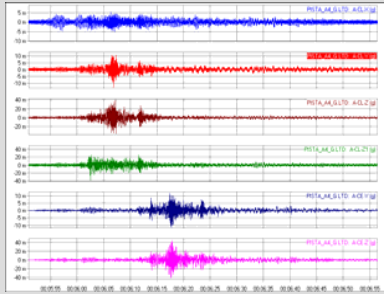
anemometer



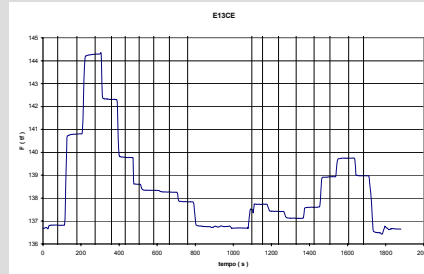
Ensaio dinâmico



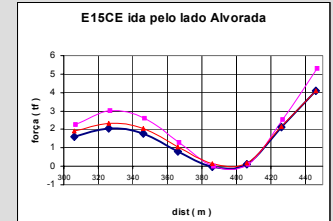
results of the dynamics testing



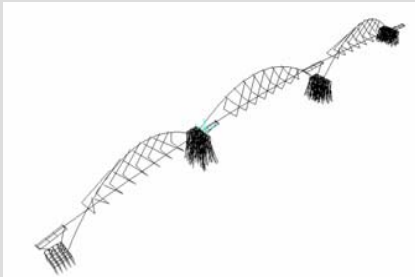
Reanálises – ensaios quase-estáticos



results of the static testing



numerical model



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Conclusions

- The JK Brasília Bridge exhibits light aesthetic qualities and represents an important architectural advanced in bridge construction, included new technological advanced in installation stayed cable;
- In the installation on the Brasília Bridge to be used the length method together the force method, monitoring the load on real time. In this case, to be used 60 load cells into stay cable between the arc-deck and the bearing system, all connected to the data logger system. With this instrumentation all the effects induced by environment actions and the setup operation (stressing operation) were measured and considered on the final assessment of the bridge, with equalized all the elements within a range of 2,5 %, as like PTI Recommendation;
- Concomitant to the load measurement were monitoring the strain, temperature and wind velocity. The strains were measured on 3 cross sections on the metallic arc and the values were used to compare and the setup of the stay cable;
- After end execution of the Brasília Bridge, all the instrumentation like load cell, temperature, strain gage, anemometers will be completed with accelerometer to do the performance testing called the "Dynamic Signature". The Dynamic Signature are use to evaluated the performance of the bridge and to maintenance works, today.

J K – Brasilia Bridge

- Owner: Companhia Urbanizadora da Nova Capital do Brasil- NOVACAP
- Designer: PROJECONSULT - USIMINAS
- Contractor: Consórcio Via-Dragados
- Contractor for Monitoring: Consórcio PROTENDE-EGT
- Completion: december, 2002

• ACKNOWLEDGEMENTS

- We would like to thank Mr. Elmar, NovaCap President and Dr. Jose F. S. Rodrigues, LSE Manager, for their unlimited help in take measures during the constructions fazes.

The End

New Pedestrian Bridge in Acre State - Brazil

Passarela Estaiada com 200 m
Rio Acre – Rio Branco, AC – em montagem



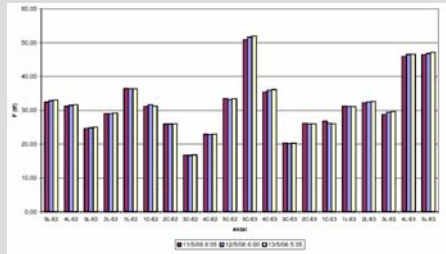
Passarela Estaiada com 200 m
Rio Acre – Rio Branco, AC – fase final



Monitoração na fase de montagem



Forças nos estais



Arranjo geral dos estais

