Geospatial World Forum
“Geospatial technology empowering construction & engineering”
18th & 19th Jan 2018.
Advances in Construction Technology
- G.B. Nagendra, Chief Engineer/Infra

Konkan Railway Corporation Limited
Konkan Railway formed in July 1990

Provide the ‘missing link’ on IR between Mumbai & Mangalore

States enroute: Maharashtra, Goa & Karnataka

Project Model: Build – Operate – Transfer

Build phase: Four years
Survey Methodology

❖ Topo Sheets of Survey of India:-
- Roha - Ratnagiri by C.R.
- Ratnagiri – Margao by S.R.
- Margao – Mangalore by S.R.

❖ Route features
- Length of route - 837 kms
- Tunneling length - 37 kms
Land Cover – LANDSAT TM Data of Jan. 1987
Land Cover – LANDSAT TM Data of Jan.1987
Land Cover – LANDSAT TM Data of Jan. 1987
Survey Methodology

- Satellite imageries used to identify:
  - Developed areas (only 35 houses acquired in Goa)
  - Mines
  - Water bodies, river crossings
  - Land under cultivation
  - Forest boundaries
  - Wastelands
Advantage of Satellite imageries:-

- Route shortening by 77 kms (10%)
- Cost of fresh Survey reduced to 10%
- Speed in finalizing alignment
- Instrumental in monitoring EMP.
RITES obtained inputs for EIA from:
- Centre for Ecological Studies – Indian Institute of Science, Bangalore
- National Remote Sensing Agency
- Environmental Monitoring:
  - Indian Institute of Technology Bombay
  - Soil, Air, Water quality, Noise pollution
Land Cover – Data of March 1997
Land Cover – Data of March 1997
Udhampur – Srinagar – Baramulla Rail Link Project in the Lesser Himalayas
Survey Methodology in year 2002-03

- Ortho photos by NRSC on a tentative alignment.
- Triangulated ground surface from NRSC DEM.
- Selection of alignment
- Preparation of Plans & L Sections.
Traverse survey of Project Area
• High resolution imageries from Quick Bird Satellite- Digital Globe.

• GIS database for thematic layers for Geology, Geomorphology, Lineaments/fractures, Drainage, Surface water bodies.

• Close loop traversing and establishment of Control Points in WGS 84 co-ordinates.
Plan and L-Section
Location of Anji bridge
189 m deep gorge
LiDAR Survey work in progress
Special features of 1315m long Chenab bridge

- Highest railway bridge in the world - 359 m above Bed Level
- Longest continuous girder on curve & transition curve : 268 m
- Largest Cable Crane for main span erection : 915 m long, 2x 20 T (cap)
Chenab bridge construction of approach spans
BIMs - Tekla Structures, Tekla BIMsight

- 25,000 MT of steel fabrication.
- All bridge structures 3D modeled accurately.
- Arch modeled in undeformed shape including camber.
- Fabrication drawings printed directly from BIM.
- 10,000 hours spent in modeling.
- Site management by Tekla BIMsight.
Isometric cross section view of Arch

Konkan Railway Corporation Limited
Side Brace Top Gusset Connection

Bottom Gusset Connection
Pier Base Connection
Overall View of Truss Girder

Bottom Chord Truss Connection

Top Chord Truss Connection
Feasibility Study
for
Thalaserry - Mysuru Rail Line Project

December 2017
Western Ghats
## Task features

<table>
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<tr>
<th>Particulars</th>
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<tbody>
<tr>
<td>Date of assignment of task</td>
<td>06th Dec.</td>
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<tr>
<td>Height of the ‘Great Escarpment’</td>
<td>700 m (1V:2H)</td>
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<td>Ruling Gradients</td>
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<tr>
<td>a) Plains</td>
<td>a) 1in 100</td>
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<tr>
<td>b) Ghats</td>
<td>b) 1 in 80</td>
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<td>Minimum radius of curvature</td>
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<td>a) Plains</td>
<td>a) 620 m</td>
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<td>b) Ghats</td>
<td>b) 480 m</td>
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<td>Target Date</td>
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## Red Lines

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<td>Block Section intervals (kms)</td>
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<td>Protected Forests</td>
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<td>Reserved Forests</td>
<td>Sparingly</td>
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<tr>
<td>Maximum length of tunnel (kms)</td>
<td>3</td>
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<td>Mega Bridges</td>
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Study Methodology

- Perusal of Topo sheets of Survey of India, LU & LC on Bhuvan Platform
- Tentative routes on Google Earth.
- Limited Ground checks with GPS.
- Refining alignments – AutoCad Civil 3D
- Extraction of Levels from Google Earth and development of contours.
- Vertical alignment, quantification
## Delivery Dates

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<td>06th Dec.</td>
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<td>Ground checks</td>
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<td>Collection of Traffic Survey data</td>
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<td>Route selection out of 4 alternates</td>
<td>22nd Dec.</td>
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<td>Abstract Estimate</td>
<td>27th Dec.</td>
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Feasibility Report was submitted on 30\textsuperscript{th} Dec.
You can’t park in the Handicap Zone just because you’ve lost your phone.
Geospatial tools provide high volumes of information with accuracy and great velocity for all levels of Business.

A key to focus only on the relevant data is knowing what one wants.
THANKS