

# **BrIM implementation for documentation of bridge condition for inspection**

Firas Shalabi, Yelda Turkan Ph.D, Simon  
Laflamme Ph.D



# Outline

- Inspection Background
- BrIM
- Sought benefits of BrIM for Inspection
- Studied bridge
- Modelling
- Framework
- BrIM inspection process
- Suvey
- Challeges
- Conclusions

# Inspection background

- FHWA requires DOTs to perform a biennial inspection
- Current inspection relies on reiterative process of manual data entry.
- This process is error prone and time consuming.
- This data is the foundation for any rehabilitation or maintenance actions.

# BrIM background

- Proved benefits during construction in cost and time savings.
- Enables storing all bridge data.
- Can be accessed from multiple locations.
- Uncertain benefits for operation and inspection

# Sought benefits for brIM

- Elimination of repetitive manual data entry
- Improved data quality and speed of inspection
- Improved access to safety data
- Improved communication between inspection key players
- Cost effective life cycle management

# Studied bridge

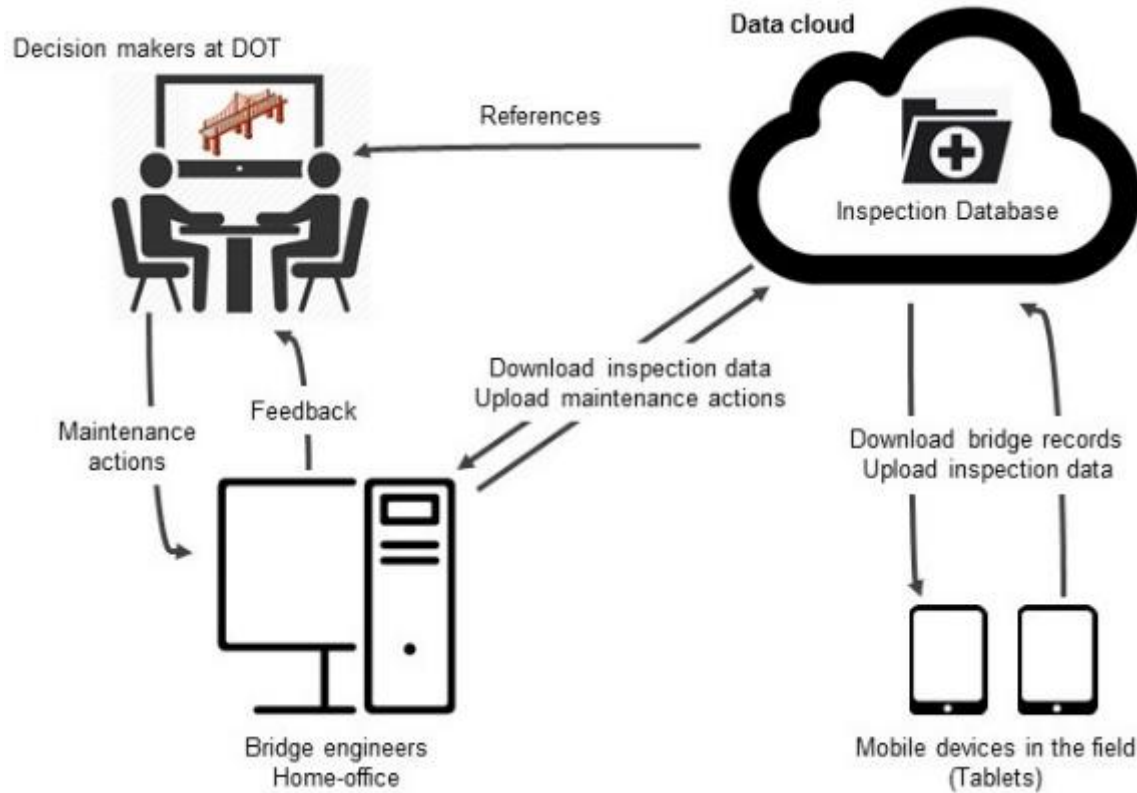
- Existing steel bridge on highway US 30.
- 2D plans were converted to 3D models by the research team.



# Modelling

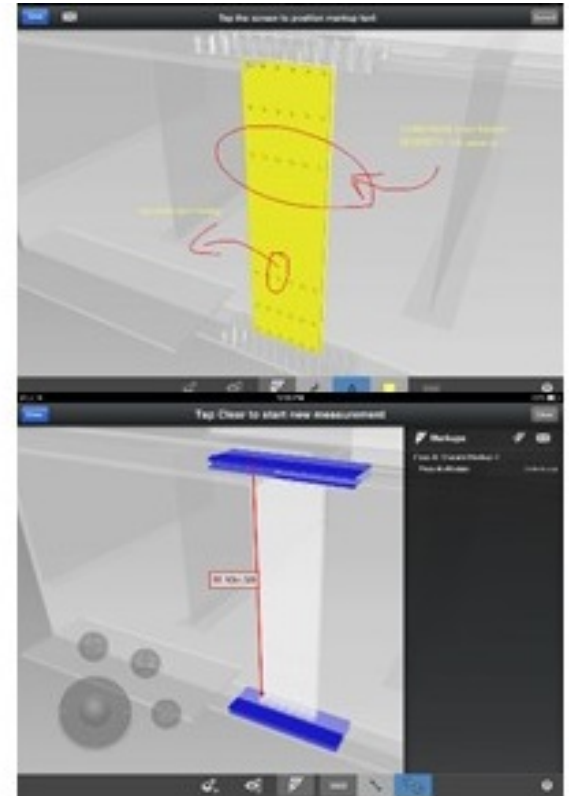
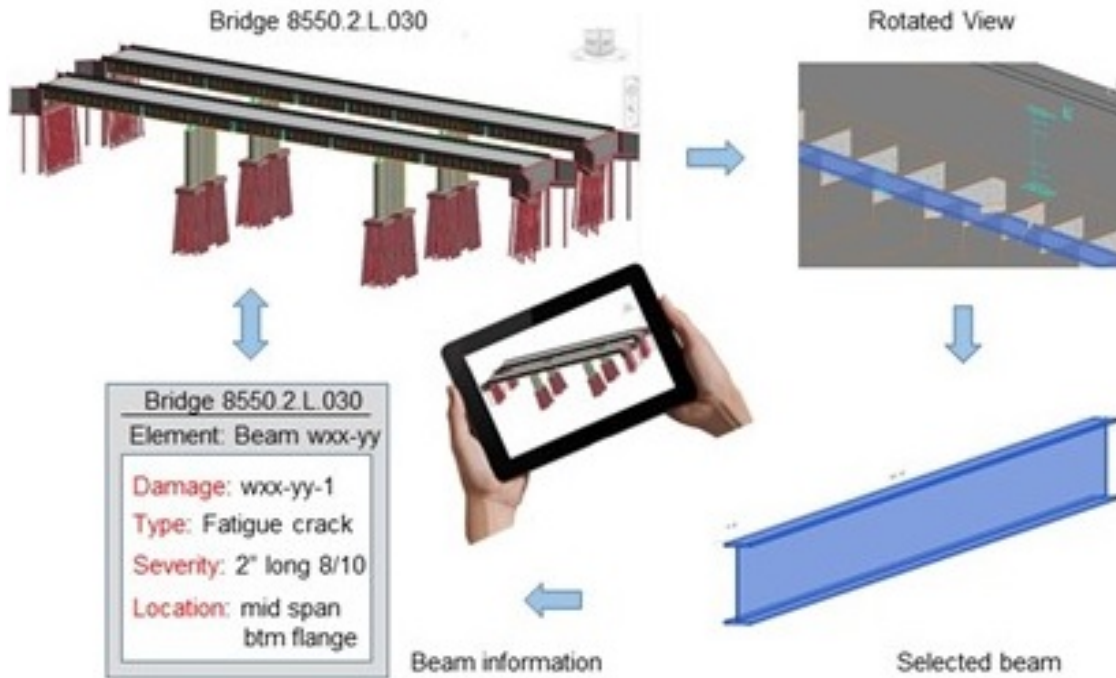
- 3D BrIM was modelled and grouped to mimic the traditional way of inspection.
- Groups were: deck, super structure, sub structure, channel and piers.
- Details were pinned to each element
- Model was uploaded to the cloud and then to the tablet

# Framework





# BrIM inspection Process



# DOTs survey

- Web based survey using Qualtrics.
- Eight DOTs including: Iowa, New York, Pennsylvania, Wisconsin, Illinois, Missouri, Kansas and Wyoming.
- Feedback on implementing BrIM for bridge inspection and maintenance.

# Survey's key aspects

- Experience on using BrIM technology
- Problems with the current practice
- Potential of the proposed BrIM framework.

# Key Findings

- 71% use Paper based method – 29% computer technologies
- 50% use 3D models during design and construction
- Surveyed DOTs think BrIM is beneficial for bridge inspection
- While testing the framework with Iowa DOT, time needed for inspection was reduced significantly.
- 60% are facing challenges with the current practice
- Aging or inadequate staff

# Challenges of BrIM implementation

- Portable electronic devices damage
- Cell phones signals in rural areas and under bridges.
- Initial cost of implementing the technology
- Human factor such as education and training
- Digital signature concern
- Integrity of data, security and confidentiality
- Lack of knowledge in using BrIM

# Conclusions

- the traditional way of inspection is time consuming, redundant and error prone.
- BrIM benefits can be extended to bridge inspection
- BrIM inspection can eliminate redundant data collection, data re-entry and minimize possible errors for personal judgment.
- Improve inspection quality and time needed.

# Conclusions

- Bringing mobile devices and BrIM to the bridge management practice is applicable.
- Improve the way sketches are drawn on site.
- BrIM benefits need to be validated in order to be widely used.

**THANK YOU**



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