3D Laser Scanning for Masonry Arch Bridges

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INTRODUCTION

“Technological Push” versus “Applications Pull”
Introduction

Technological Push - TLS
- Developed for Petroleum and Mining Industries
  - Volume
  - Pipe Run
  - Rapid Acquisition

Introduction

Applications Pull
- Several Applications – purely as a result of initiative
  - Civil
  - Structural
  - Architectural
  - Defense

- Bridges
CLIENTELE

“Progressive clients are paramount for successful projects”

Architects, Engineers and Government

- General Knowledge of Surveying
- Limited Exposure to Laser Scanning
  - Outputs and usability
  - Acquisition Benefits
  - Transition from 2D and Plan Deliverables to 3D
  - Emerging Technology
- Cost vs. Initial Benefit

The Client is taking a Risk each time this new survey “application” is applied

The benchmark for survey and spatial solutions
TEAM

“Effective team management promotes project stability, structure and performance”
Collaboration between GHD Bridges (Vic) and Vekta
Works completed for Department of Transport
Overseen by Heritage Victoria

Acquisition

Pre-Loaded and Post Loaded
Providing Results

Deviation measurement of the two surfaces – Contour Iso-pach plans

Engineering Analysis

Thrust Line for this bridge – Elliptical (weak) system
Propping the Bridge for Safe (Temporary) Use

False-Work and Grout Bags – to meet zero-impact requirements

Permanent Reinforcement

As close to the existing surface as possible
Provided location of Surface at chainages
Point Cloud Sub-Sets

Cost Effective Solution
Data Conversion and Analysis

The benchmark for survey and spatial solutions

Data Conversion and Analysis

Section slice in AutoCAD – for use by Engineering CAD Operators
SUPPORT

“Service Providers aim to keep us at the leading edge of the market”

Support

Developers and Designers/Equipment Sales and Service – Tier 1

Service Provider – Tier 2

Client and Consultants – Tier 3
CLIENTS & CONSULTANTS

Tier 3

Detailed Analysis

Temporal Modelling and Analysis
The benchmark for survey and spatial solutions

Statistical Analysis of position over time

Detailed 3D Models

Accurate Acquisition and Visualisation Capabilities
Capabilities and Support

150%-500% Conventional Surveying Cost

Benefits

Timeframe

Usable Data

CAD Plans

SERVICE PROVIDERS

Tier 2
Service Providers

Competent
Knowledgeable
Modelling Toolbox
Efficient and cost-sensitive

Support Client and Consultants

DEVELOPERS AND DESIGNERS/
EQUIPMENT SALES AND SERVICE

Tier 1
Client Delivery

• Cyclone
  • AutoCAD
  • MicroStation
  • Revit
  • NavisWorks
  • PDMS
  • 12D
  • Rhinoceros
  • Sofistik
  • CivilCAD

Relational Object-Based
(Cyclone/Rhinoceros)

Non-Relational Object-Based
(AutoCAD)

Relational Object-Based
(Revit, PDMS, NavisWorks, Sofistik)

Thank You