

Project Name: Rock Wall along SR322, Mt Pleasant, PA
Project Description: Survey of steep rock face to resolve removal quantity dispute
Scope: 2,200' long x 300' high
Owner: Pennsylvania Department of Transportation
Project Date: May 20, 1999

3



“One compelling issue for us is safety: when we used Cyrax to scan the rock face on Hwy 322, we could just point the scanner up the rock face and get detailed data of the shape and volume of the rock face. We used this data to calculate the amount of rock removed and compare our calculations with estimates from our contractors. Without Cyrax we would have had our surveyors physically rappel from the top of the rock — a very hazardous and time consuming undertaking.”

**Brad Foltz, Chief, Photogrammetry and Survey Division
 Pennsylvania Department of Transportation**

BACKGROUND: The Pennsylvania Department of Transportation contracted rock removal from a rock face overlooking SR322 at Mt. Pleasant, PA. In order to verify the contractor’s estimate regarding the the volume of rock removed, PennDOT scanned the face using the *Cyrax* system. Contour maps generated directly within Cyra Software were exported to AutoCAD® and MicroStation®. Volumetric information was compared to that prepared by the contractor.

PROJECT: 8 scans were taken along a major test section of the rock wall. Individual scans were registered together to form one uninterrupted cloud of points of the entire rock face.

PennDOT used a total station to verify the accuracy of the *Cyrax* system and to aid in registering multiple scans together. PennDOT surveyed 9 survey control points. Each survey point was also scanned by *Cyrax*. Using the *Cyrax* field laptop, the

crew could immediately compare measurements while still in the field and verify the accuracy of the data.

After the fieldwork, Cyra Software was used to provide 3D visualization of the rock face and also to automatically generate contour maps. These maps were directly exported into AutoCAD® for further analysis.

Using the advanced capabilities of the Cyra Software, PennDOT engineers also created a series of vertical cut sections through the face to establish different cut profiles. Similarly, volumetric information was quickly extracted and compared to figures submitted by the contractor.

Based on the tests, PennDOT has acquired two *Cyrax* 2400 systems for challenging survey applications throughout the state.

PROJECT FACTS

Cyrax	
Field man-hours	40*
Office man-hours	15
Total man-hours	55

*Extrapolated from partial survey

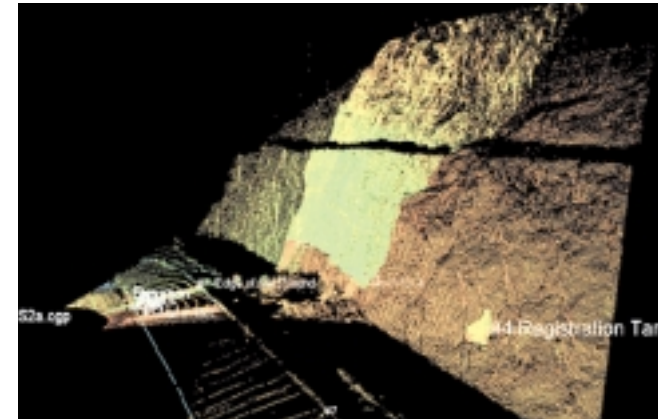
Conventional comparison	
Field man-hours	480
Office man-hours	20
Total man-hours	500

CYRAX BENEFITS

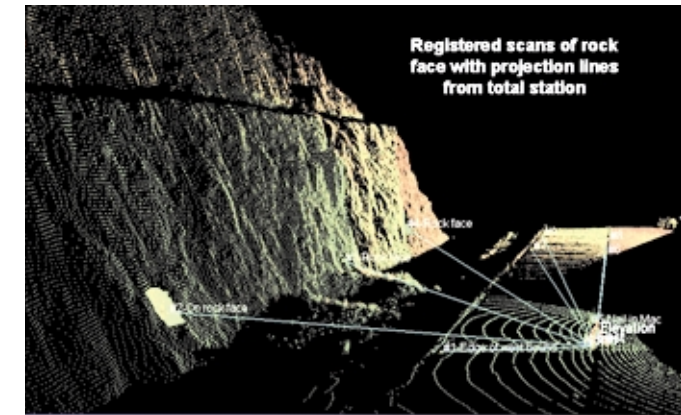
- Major savings in survey cost and time
- Increased safety
- Extra completeness and detail allow more accurate volume calculations



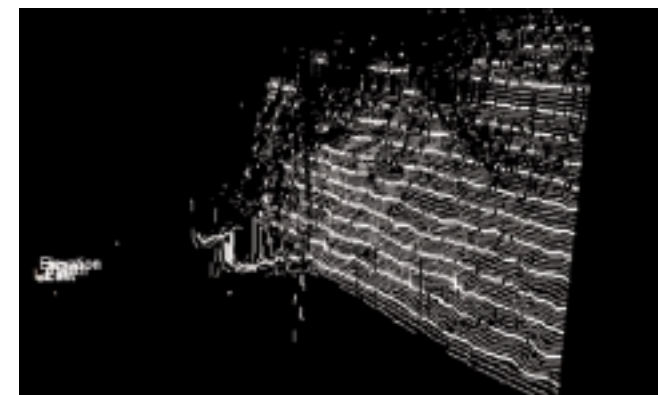
Rock wall adjacent to SR 322 at Mt. Pleasant, PA.



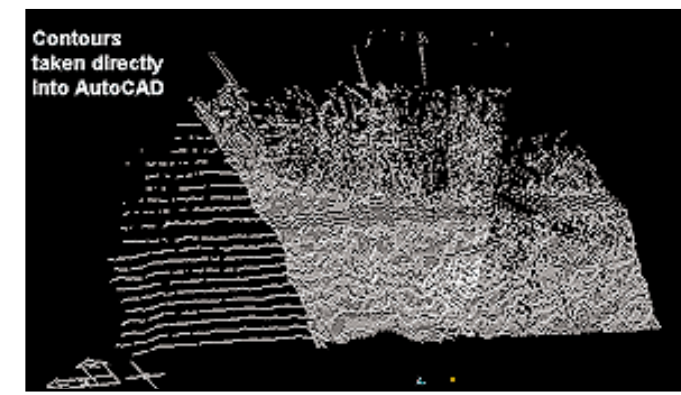
Individual scans were registered together to form one contiguous object.



A total station was used to survey control points to verify the accuracy of *Cyrax* data and allow easy registration of multiple scans.



Cyrax created instant contour lines of the wall.



Contour lines were directly exported into AutoCAD® for further study and design.