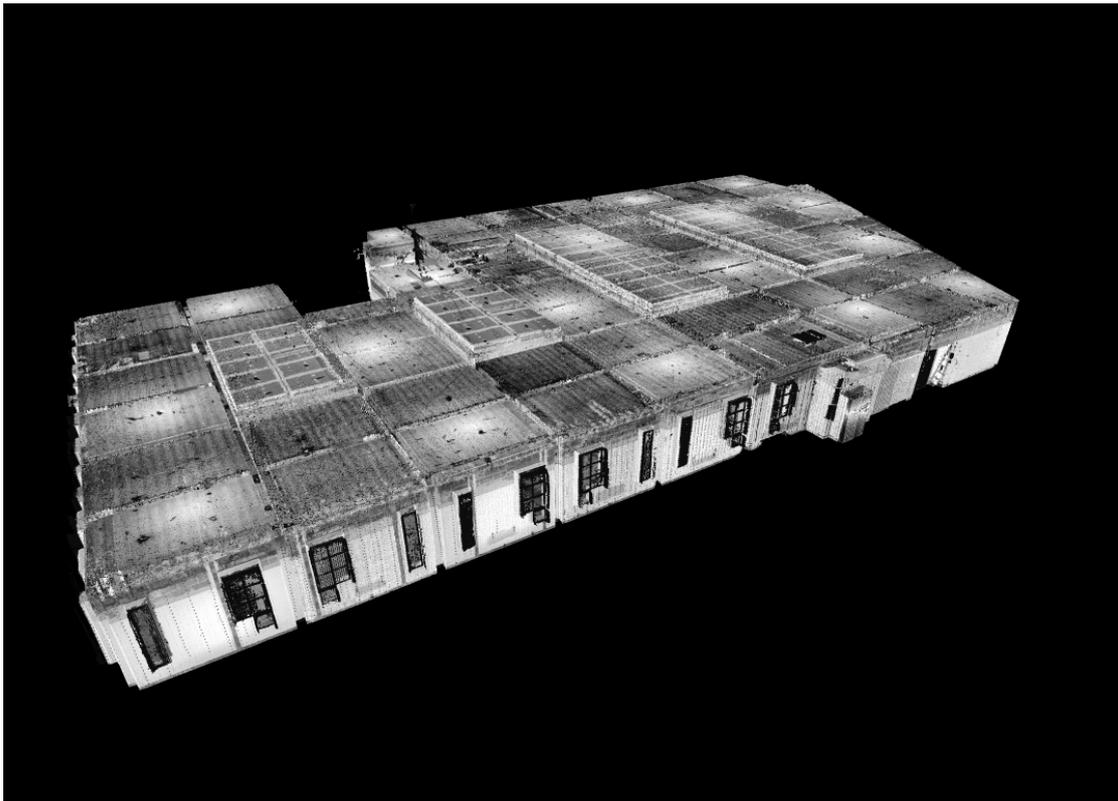


3D Laser Scanning The benefits for Building Refurbishment/Retrofit Design and BIM Integration



The registered pointcloud of one floor in
Lord Hope Building

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Case Study – Lord hope and Curran Buildings in Glasgow

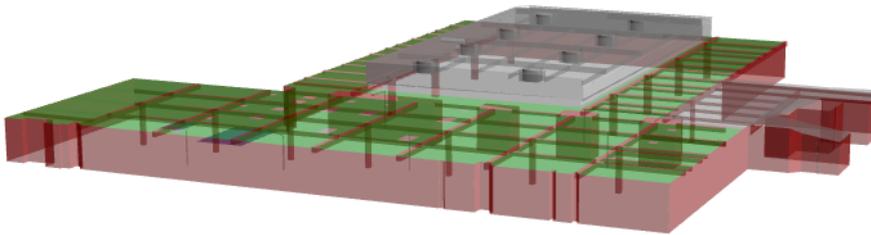
Lord Hope and Curran Buildings in Glasgow are part of the Strathclyde University Complex in the centre of Glasgow. Four floors of Lord Hope and the top floor of Curran had been stripped out ready for a refurbishment and accurate 3D dimensional data was required to start the M&E design. Earlier surveys had indicated that the floors were uneven and due to the required height of the ceiling there was little space for the services in the void. Utilising laser scanning meant that all the surface deviations were picked up and modeled allowing our client to determine where to level out the highpoints to maximize the use of the void space. Additionally all other potential obstructions such as structural elements (steelwork, walls, openings etc) and piping were included in the model allowing precise design of the M&E elements.

The scanner was mounted on a tripod and leveled and each scan was positioned in such a way to maximize the coverage, registration targets were deployed in such a way to ensure accurate registration of the point cloud data. Each scan takes approximately three minutes to complete and in the case of Lord Hope floor six nineteen scans were required.



Internal Point cloud Image

All the processing of the point cloud data was carried out in Scantech's offices in Cheshire, employing the application of specialist software to accurately register the individual point clouds together and then to generate the 3D models. The resulting 3D models were then exported as AutoCAD 3D models and then emailed to the client.



Ideally data registration and delivery would have been improved by coordinating the data to either a local grid or to OS (using GPS), allowing for a fully integrated 3D model so that any services passing through each of the floors could be coordinated accurately. We would recommend that this approach is adopted for future work.

In summary the advantages of using laser scanning for this application included:

- A massive quantity of data for all six floors (8,000m²) was collected in just 12 hours scanning time
- An accurate 3D model was quickly produced allowing the design team to start work 4 days after the scanning was completed
- Panoramic images were provided from each scan position to aid the designers.
- The data was accurate to 5mm throughout
- The data was collected without the need for scaffolding or ladders to reach “high spots”
- The M&E designers were working to as-is data thus eliminating clashes during construction