FUTURE AFTER FIRE

The Renovation of the Eckhart Public Library

Here are the remains of the circulation desk area after the fire was extinguished. This is the location of the book return drop box.

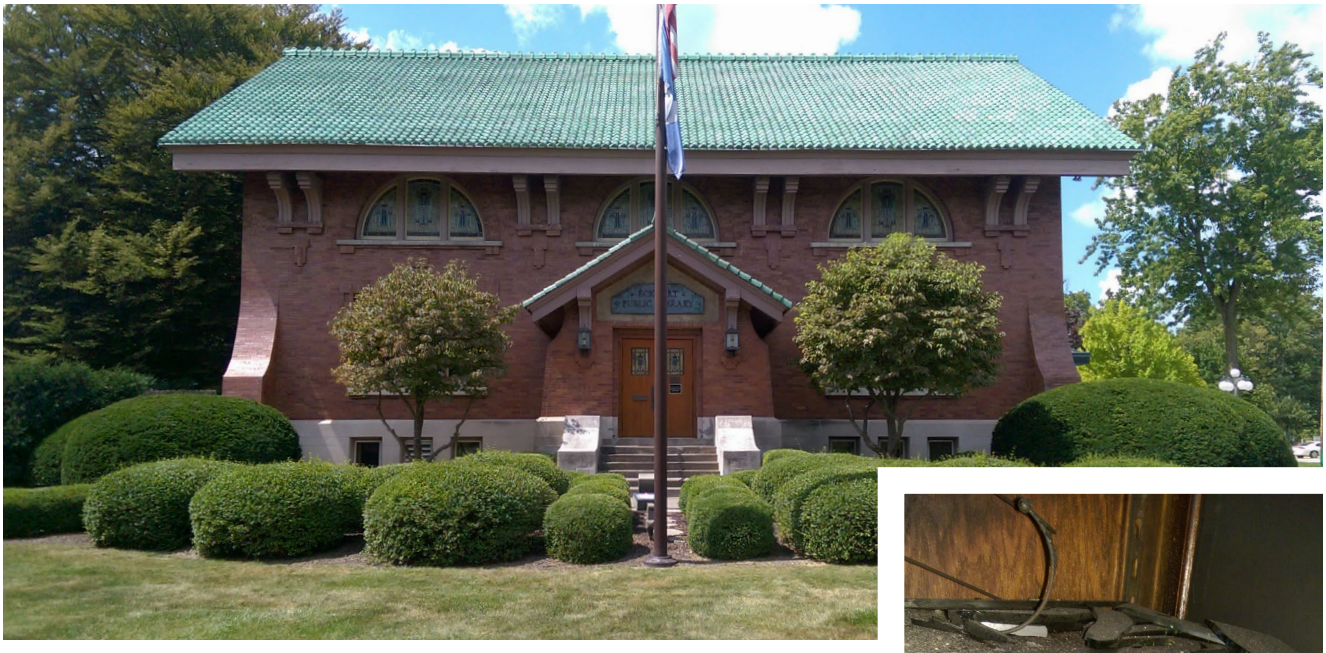
In the early morning of July 2nd, 2017 3 individuals were wandering the town of Auburn, Indiana looking to cause trouble. That trouble resulted in 1 of the 3 dropping a lit 1" mortar style fire firework in the return book drop box of the Eckhart Public Library. The result was an intense fire that caused an estimated 3.4 million dollars' worth of damage to the building and its contents. The Auburn Fire Department was quickly on the scene and had the fire extinguished within 10 minutes of arriving. Even with their quick response the damage was horrific. Within a week of the fire the Auburn Police arrested Nykolas Elkin age 24 for the arson. He later admitted he placed the lit firework in the drop box; he was convicted and sentenced to 14 years in prison for the crime.

BY CHUCK KNOX

The Eckhart public Library was a gift from local automobile manufacturer Charles Eckhart in 1910 to the community of Auburn. It is a beautiful 2 story brick structure built in the arts and craft style. Since its inception, the Eckhart Public Library has been cherished by the Auburn community and the destruction of the interior by an act of malicious arson has been devastating to the community.

By the 1990's the library had outgrown the original brick 2 story building and an addition was designed by the Fort Wayne based architectural firm Morrison/Kattman/Menze. George Morrison's design was approved by the Library's board and the modern addition finished in 1996. It was the drop box of the 1996 addition that Nykolas Elkin placed the lit commercial grade firework. Two weeks after the July 2nd fire Knox Decorative Painting LLC (KDP) was hired to oversee the restoration of the building.

The Eckhart Public Library has long been a proponent of new technologies and this can be traced all the way back to founder Charles Eckhart. It was a new technology; the internal combustion engine, that Mr. Eckhart and his two



The original main entrance to the Eckhart Public Library.

Damaged display case and some of the contents which were located near the circulation desk.

sons, combined with the horse drawn carriages the Eckhart Carriage Company manufactured that would quickly propel the small town of Auburn to the forefront of automobile manufacturing in the early part of the 20th century. The resulting company would evolve into the very successful and innovative Auburn Automobile Company. Even today the Library's board understands the need to use and adopt new technologies. When the power of a LiDAR and photographic scan was described to the board they immediately understood its relevance to their fire damaged building. KDP recommended they hire BIMRAY to scan the interior of the building and the board unanimously agreed. The Library Board Members could clearly see that the LiDAR scan and accompanying photographic images would go a long way to solve many of the problems they were facing in the smoke and fire damaged main library.

Most pressing was the board wanted to document the current conditions of the damaged structure. The insurance policy the library has pays for the reconstruction of the building and replacement of the contents to their conditions prior to the fire. It was hoped the web viewer provided by BIMRAY could be used to make sure all the larger contents were documented. The board also wanted to use the web viewer to document the condition of the building for future generations to see the destruction and damage resulting from the fire.

The web viewer was also to be used as a tool to help with the raising of needed funds above and beyond the amount paid by the insurance policy. The true extent of the damage could be shown to potential groups wanting to donate to the restoration of the building. Cincinnati Insurance (one of the premier insurance companies of the mid-west) would pay for the restoration of the library to a condition prior to the fire, however the library board and staff wanted to make changes to the structure. With the advent of the internet and advancing computer technology libraries function much differently today than they did 20 years

The 1st floor of the historic building suffered extensive heat and smoke damage.

ago. The library board wanted to make changes to the structures' interior that would embrace new available technologies.

With a new library design, the board saw the importance of providing a detailed LiDAR derived point cloud to MKM, the architectural firm designing the changes to the building. MKM would use the LiDAR data to provide a 3D model of the structure in its current rough condition and a 3D model of the new shiny design. The point cloud created by the LiDAR scan is turning out to be very useful. MKM used the point cloud data to draw 2D floorplans and then will use the data in a 3D design to help the library board and staff visualize just what the newly designed library will look like and how it will function.

The indoor scanning system used by Viametris in the fire damaged area of the 1st floor.

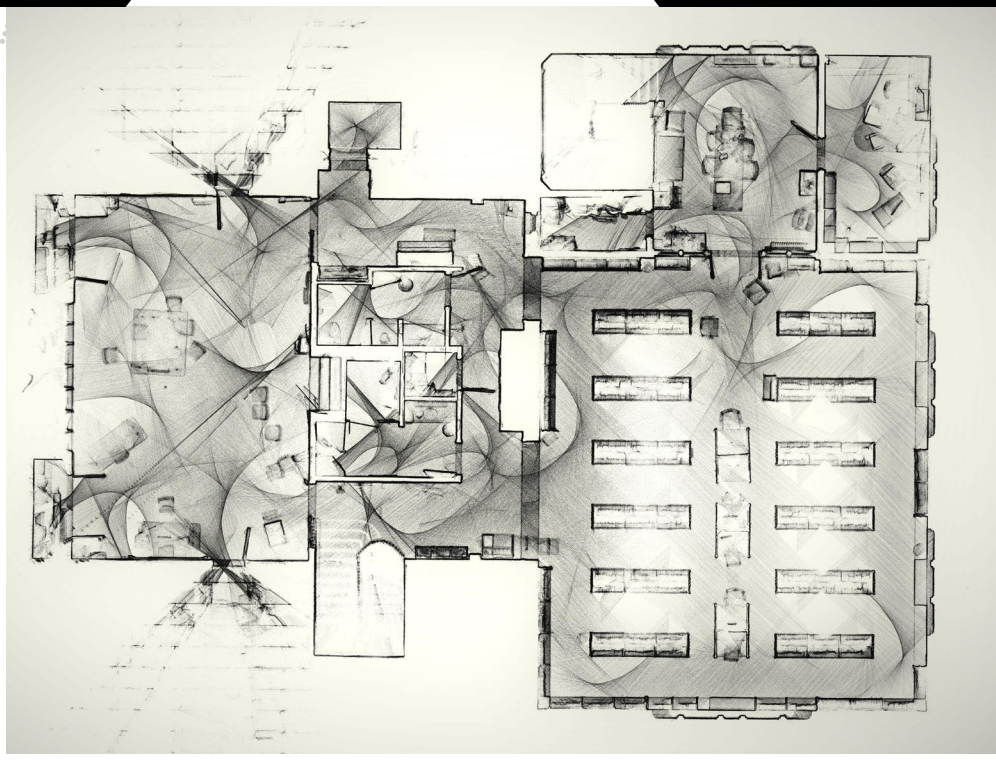
The scan was scheduled for 8/11/17; eMAPscan arrived early in the morning with 3 technicians and equipment. eMAPscan uses the Viametris indoor mobile scanner system (iMS3D). This indoor scanning system is mounted on a rolling cart; the cart has a 360 degree camera and 3 LiDAR scanners. This rolling technology allows for the scanners to cover large amounts of square footage in very little time.

Running the scan in the damaged portion of the building would prove to be a challenge. A path through the rubble of the 1st floor needed to be cleared so the wheeled cart could be pushed through the building. Pierre Lefevre from eMAPscan planned a

path through the 1st floor of the building and after planning the scan began. The basement, two floors and the exterior of the library had been scanned by noon. Library Director Janelle Graber conferred with the board and they decided that with the extra time and an available scanner an additional building should be scanned. What we have learned is that for accurate documentation of a building and its contents it is important to scan before a fire, not after.

A uniform carbon black layer of soot covering the entire 1st floor of the modern building made illumination of the damaged area a challenge. The original lights had been destroyed by the fire and temporary lights were installed. The walls and ceiling reflected virtually no light. The cameras used by Viametris iMS3D needed additional light in the smoke damaged areas, the temporary lights were not sufficient. Editing was needed for each photographic frame taken in the portion of the building damaged by the flame and heat to lighten the exposure. Even with the editing, the resulting images of the destruction are darker due to the conditions created by the fire.

Most of the interior of the modern side will need to be demolished due to the damage caused by the fire. With the web viewer provided by BIMRAY we can use the visual scan of the building to travel the building in a virtual tour, documenting everything as it was before demolition. This scan gives us a good look at the interior of the structure to make sure we do not miss anything taken during pack out of the contents or destroyed during demolition. While it is not a substitute for a physical count of all contents, it gives us a good look at what was in the building before pack out began (if you don't count it; it doesn't count).



2D floor plan of the 2nd floor with contents created with the LiDAR derived point cloud. Image created with Cloud Compare.

In the past, LiDAR scans of buildings have proved to be too expensive to be used universally. The rolling scan by Viametris is much more cost effective than the static tripod mounted scanners that must be moved and reset throughout a building. The Viametris technology makes the power of the laser scan economical and within reach of most projects.

Alan Sweeny II is the Technology and Maintenance Manager for the Library This was his first experience with LiDAR and said "When we look back on this event in the future it is truly mind-blowing to me that we will be able to see the condition of the library from the time of the fire in three dimensional space. This is not something I would have imagined was possible until learning about LiDAR technology through this project."

Currently, scanning a building prior to construction is not a common practice. Neither the library's Insurance Co., their construction consultant, nor the general contractor had ever worked with point cloud data. This project will be only the 2nd point cloud the architect has worked with. In time scanning a building prior to remodeling will become commonplace and manipulating point clouds second nature as more in the construction industry become comfortable working with BIM. The restoration of the Eckhart Public Library will be many of the projects contractors' first experience with the technology and without doubt not their last.

Chuck Knox is the owner of Knox Decorative Painting LLC (KDP). KDP is located in Fort Wayne, Indiana and has worked on many important projects in ne Indiana and nw Ohio. Chuck is also the owner of Knox Geological LLC and it is through his geology work that he started working with LiDAR correlating surface features and sub surface faults and fractures in drift covered areas.