PRAIRIE VIEW A & M UNIVERSITY SCHOOL OF ARCHITECTURE CURES CENTER

Documentation and Preservation of Historical Monuments in Nepal using 3D Laser Scanning Technology

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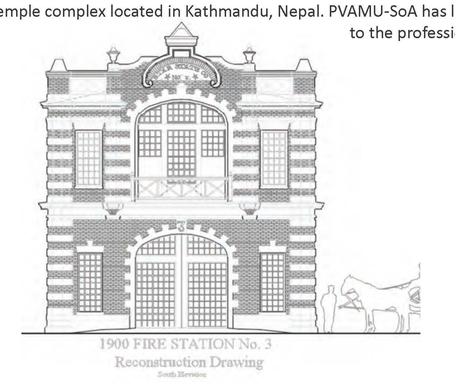
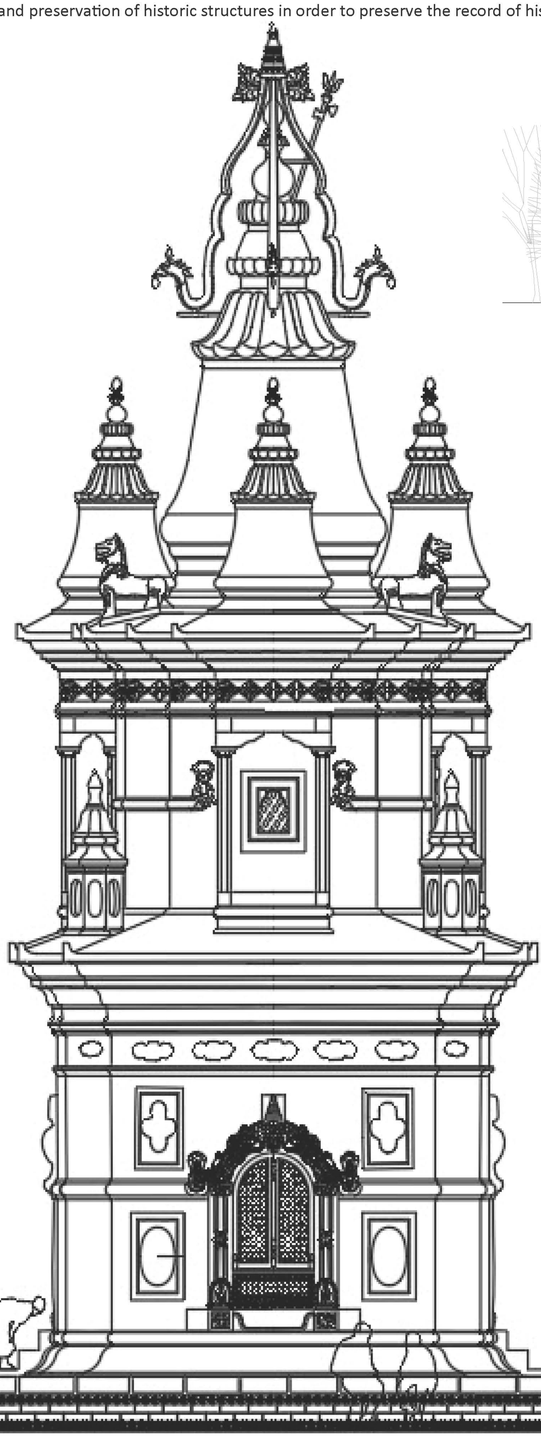
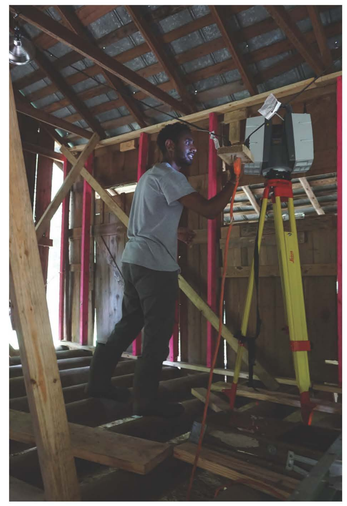
ABSTRACT

Nepal is a country known for its rich cultural heritage and architectural legacy. The Architecture is recognized worldwide from the myriad of anonymous street temples, large and small, to the inimitable marvels of Newar, Nepali Architecture situated in one of the three Durbar Squares in the Kathmandu Valley. Nepal has one of the highest concentrations of World Heritage architecture and sites, some dating from the 13th to 17th centuries. Nepal's unique architectural character is part of the living fabric of Nepali life, past, present, and future. Recently, Prairie View A&M University, School of Architecture in collaboration with UNESCO-Nepal, conducted a comprehensive 3D laser scan of the historic Pancha Deval Temple complex located in Kathmandu, Nepal. PVAMU-SoA has long recognized the importance of preservation and creating digital and analog records of historic sites as a component of their CURES program. At PVAMU-SoA, we contribute to the professional documentation, and preservation of historic structures in order to preserve the record of historical culture and heritage.







INTRODUCTION

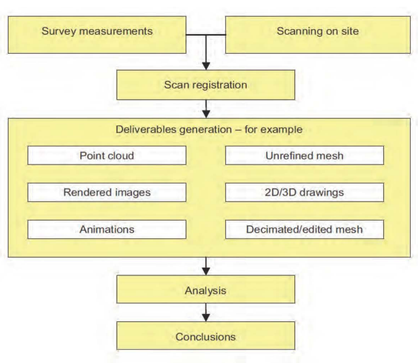
PVAMU-SoA faculty, staff and students use 3D laser scanning technology to produce historic preservation projects that increase awareness of the educational, and cultural fabric of societies as well as their historic value, and digital documentation. Our program offers, especially to students, the opportunity to acquire sophisticated work experience and learn an advanced skill that will be useful in their future.

OVERVIEW

Nepal lies on top of two colliding plates, the Indian and Eurasian and is extremely prone to earthquakes, landslides, and avalanches. In 2015, the Gorka earthquake devastated the entire nation of Nepal, killing nearly 9,000 people and injuring nearly 22,000. There was also damage to more than half a million homes and other buildings. It was the worst natural disaster to strike Nepal since the 1934 Nepal–Bihar earthquake. Nepalese Architecture is a unique archetype among its neighbors and the architectural tradition forms an authentic cultural legacy that has remained unchanged over the centuries.

METHODOLGY

The PVAMU-SoA Fabrication Center has the capacity to fabricate large architectural models as well as small details. Recently PVAMU-SoA reconstructed a scale model of one of the historic Pancha Deval Temples from the complex of five at Kathmandu. The fabrication process starts with drawing the three dimensional model using one of several software programs such as; AutoCAD 3D, Revit, SketchUp, and Rhino. For the Pancha Deval Temple, we used our F370 3D printer, which has the highest quality and speed on the Stratasys 3D printer line. We divided the model into three separate pieces printing to 1/1000 of an inch per slice height.



FUTURE

We believe in sharing our knowledge and expertise and are willing to work in tandem and in partnership to train and establish connections to other schools of architecture, planning and engineering departments especially in Nepal where there is such a strong desire among the Nepali government and people to preserve their heritage and architecture. It is, therefore, our honor and privilege to establish these partnerships and participate in the growing global awareness of historic preservation, archival drawing, and professional documentation that embodies the timeless memory, history, and continuity of culture, people and place.

ACKNOWLEDGEMENTS

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REFERENCES

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Freedman's Town, Houston, TX
Jim Shanlkle Home and Cemetery, Shankleville, TX
The Baylor Female College, Waco, TX
Cane River Creole National Park, Natchitoches, LA

LASER TECHNOLOGY

Historical buildings with complex elements are often difficult to measure with conventional surveying material. By scanning buildings, facades and interiors using a 3D laser scanner, one can easily generate and define accurate data through safe, non-contact means. The 3D laser scanning technology captures large and small-scale projects efficiently and with precision. This facilitates the reproduction of structures and details with spectacular accuracy and delivers the highest quality 3D data and High Definition Resolution (HDR) imaging.

ANALYSIS

The PVAMU-SoA CURES Center engages with partners nationally and internationally in their effort to preserve and document their historical sites. In doing so, our faculty, staff and students gain valuable experience working toward their educational goals. We strive toward a high level of achievement and success that provides the groundwork for lifelong learning. This endeavor fosters intercultural understanding, and supports the historic preservation vision of World Heritage sites strengthening bonds between nations, societies and people.