Graduation reflection
Ruin Prosthesis

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Ruins prosthesis,
Building on the remnants of history with the technique of the future

Research

The Objective of my graduation research was to integrate digital techniques within the practice ruin renovation to achieve a more efficient and beautiful result. To achieve this goal two major researches have been conducted:

The first study examined the value ruins have to offer. The study included both research to writings on ruins and ruin value and studies to precedents in architectural design within the context of the ruin. It concluded that Ruins can be seen as allegory for transience and decay. They serve the purpose for society as places for nostalgia and reflection. The renovation design should therefore never erase or corrupt the traces of the past but should create a harmony with the existing that emphasizes on former state of decay and layers of history present in the ruin.

A successful renovation design achieves both Harmony and contrast between old and new. A series of case studies on ruin extensions shows that technique is often the key aspect to a successful articulation of this position. The balance between old and new that architect envisions is most visible at the direct joint of old and new (fig). In general, to achieve a satisfying joint, an excessive amount of craft is implemented. The use of digital capture and fabrication has the potential to be the tool to make that joint in a more specific, more customized and more elegant way than before.

To realize this, the workings of 3d scanning have been studied in both literature and practical experiments in order to state their suitability for the proposed design. With the obtained knowledge, a few proposals for building details that integrate digital capture and fabrication with standard building methods are conveyed and studied to conclude that the method has great potential and could be elaborated further in prototyping on architectural scale.
Hypothesis

How can digital capture and digital fabrication be used to build a ‘prosthetic’ extension to a monumental ruined structure?

ruined structures

- What is the load bearing capacity of a ruin?
- How does the architectural position inform the technical design?
- Which building methods are applied extend a ruin?

Research methods: case studies, interviews

digital capture & digital fabrication

- What scanning techniques are available?
- How do they work?
- Which ones could be applied to a ruin?
- How accurate, quick, expensive etc. Are they?

Research methods: Literature, experiments

prosthesis design

- what building methods could be compatible?
- What might a connection look like?
- How are they produced?
- How to assemble the elements?

Research methods: Literature, research by design

Conclusions

further research
Above: Case studies of joins of ruins and extension.
Img from top left to right:
Kolumbmuseum, img. from www.architectureanddesign.com.au
Naturkunde Museum Berlin, img by Christian Richter
Blencow Hall, img from www.messynessychic.com

Astley castle, img. from www.dailymail.co.uk
Castle Terworm Heerlen, img. from www.tripadvisor.ca
Raglan Castle, img from http://www.davies-sutton.co.uk/

Below: connection of solid wood to a broken wall, own image of design experiment
All Images adapted and put together by author
Design
The Parkstad region in Limburg is a troubled region that deals with population shrinkage, building vacancy and a regional ‘identity crisis’ after a shift away from the old mining industries. The region is surrounded by a beautiful green landscape but due to unclear boundaries between the green and the built areas, those characteristics are invisible at present. The region needs a clearer configuration routing and purpose for its green area’s in order to live up to its name: ‘parkcity’. A International building exhibition (IBA) will be held in 2020 and is bound to enhance the region. In its call for entries for the IBA is stated: They want building projects that will use ‘Flexibility, creativity and innovation to give the region new elan’. The region needs innovative solutions with the existing building stock to forge a new identity for the area. The ruin of castle Schaesberg is located in one of the green areas. It is a 16th century castle in a far progressed state of decay and is no longer accessible due to the danger of collapse. There are currently plans in development to reconstruct the castle in its exact original form. This graduation project aims to give viable alternative for those plans.

The design should provide a reversible functional rehabilitation of the structure that reflects on its history without imitating it. The renovation should give a positive impulse to the area of Parkstad by both its appearance its novelty and its program containing a restaurant, workshop and exposition space. The design with the surrounding park should connect and give strenghten the green areas of Parkstad.

The relationship between research and design
The design has been well founded by research, both in a conceptual and a technical sense. Studying the (vastly different) takes on renovating or restoring ruins by both theorist and designers has been valuable to form a position to the design assignment. The case studies provided both direct reference for this approach and technical solutions to problems of the construction design and design of detailing. Even with this foundation, the design process proved difficult at times. I had to re-evaluate and apply the chosen approach differently to single spaces and details. David Chipperfield named this constant reconsideration the reason why his 10 years renovation of the Neues museum in Berlin was both his most difficult and his best work up to date. I hope this will become true for me to.

The technical research to digital capture and production has been a valuable input in the design of construction details. For the construction design I chose to combine my digital techniques with existing building methods of concrete formwork and window frame production. The design has not become a pure showcase for technique but has remained a modest application of it. This feels sensible to me; technique, novel as it may be, remains a means to a goal and not a purpose in itself. I used the technique to mould and form the concrete and wood the way I wanted to. The alternative of a more ‘showcase design’ of digital capture to production done on a smaller scale in a temporary form to me remains an interesting path not taken.
Relevance, exploring new methods of customization, connecting digital production and craft.

This project is a manifestation that speaks out on two main themes. Firstly the position towards heritage, and in particular to structures in a progressed state of decay. The project argues for a renovation were the tracks of decay and ruination are not erased but included in a new harmonious structure. And secondly, for a design with history that shows it history through forms of (abstract) representation but not imitation.

Secondly and of most importance, the project shows the possibility of application of a relatively new technique; the inclusion of 3d scanning in manufacturing. The design explores some of the possibilities in architecture and can contribute to the development of the technique. These digital techniques may become increasingly important, some even speak of a ‘new industrial revolution’. This eager anticipation is most felt in the field of 3d printing but because of its cost and low speed, 3d printing is still bound to the field of prototyping. The potential of digital fabrication is that design can be more specific, more detailed and less repetitive because the production of unique elements has become as efficient as the production of identical ones. The ‘new industrial revolution’ is based on the idea that design can become custom made for all, opposed to mass produced. The challenge that is in front of today’s progressive designers is to find out how and where to implement this customization. The use of digital fabrication does not only allow highly specific solutions. It demands it. If there is any true contribution of my project, it is to show the potential of combining sensitive repair and renovation architecture and digital craft.