

FIXED FLEXIBILITY

*Adaptive Reuse: Odda Smelting Works -
The Shell Roof*

01. A B S T R A C T

DIPLOMA PROJECT
MASTER OF ARCHITECTURE

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BACKGROUND AND LOCATION

The site of **Odda Smelting Works** (OSW) is an important industrial and cultural heritage pearl located in the Western part of Norway, near famous tourist destinations such as Trolltunga and Hardangerfjorden. The municipality of Odda is home to roughly 7000 inhabitants (SSB, 2019), the majority of whom assign OSW a prominent local significance.

OSW has been active in the period from 1924 until 2003, when the company went bankrupt and production of chemical compounds, primarily cyanamide and carbide, was laid off. With the disappearance of this **cornerstone company**, the town of Odda has suffered problems with a population decrease as well as an overwhelming abundance of obsolete building mass, making up for approximately 40 000 square meters of industrial buildings. There have been successful municipal efforts to revitalize and reuse some parts of the factory (known as "Oddaprosessen"), but the majority of the industry-specific building mass has still not adopted any new functions.



Fig. 1: Former Odda Smelting Works site and adjacent industrial areas (The Shell Roof circled)



Fig. 2: Aerial photo of the Smelting Works dated between 1932-1938
Retrieved from Norsk Digitalmuseum

THE SITE

After a close study of the structural layout at the factory, combined with a fieldtrip to the OSW in August 2020, I have identified a potential transformation object, known as **Skalltaket** or **The Shell Roof**. This premise-defining piece of architecture is a 160-meter long roof-structure of reinforced concrete in the former carbide processing-area of the Smelting Works. The Shell Roof has primarily served as a storage area for raw materials. It was built in 1955-56 and is a prime example of Norwegian industrial architecture that utilizes raw untreated concrete and falls under the architectural style known as brutalism.

Historically, this structure has had more additional dynamic functions to it. It has been a combined unit for transport, storage and processing of lime and coke. In addition, the adjacent substructures have been housing lime kilns for carbide-production (Fig. 5). The shell roof has been an important part of the OSW-production chain near the Opo-river.

Since the demolishing of the adjacent lime kilns in 2011, the 5000 m² - roofed space stands unutilized, occasionally housing temporary functions, such as various local events and arrangements that require a roofed shelter for public gatherings (Fig. 4).



Fig. 3: The Shell Roof as seen from Hjølotippen, 1959
Retrieved from Norsk Digitalmuseum



Fig. 4: Example of a cultural arrangement taking place under the shell roof in 2014. Retrieved from Hardanger Folkeblad



Fig. 5: Some of the adjacent fixtures and material transport belt (above). August 2020



Fig. 6: The Northern end of the roof, tightening tower for material transport (right). Ovn 3 (Carbide Kiln 3) in the background. August 2020

POTENTIAL FOR REUSE: CHALLENGES AND OPPORTUNITIES

There is a lot of potential in transformation and reuse of appropriate parts of the shell roof in order to benefit future growth and development of the area and the region as a whole. Multiple feasibility studies have been conducted in the period of 2006-2016, in which reuse of the shell roof has been suggested. However, certain challenges are presented by the fact that this particular structure is a part of an on-site building selection that is listed as an **UNESCO Industrial World Heritage Site**. The structure is also pronounced as a *protected building* by the Norwegian Directorate of Cultural Heritage (Riksantikvaren). Protection regulations include main elements such as floor plans, materiality, surface treatment, permanent fixtures, permanent production equipment, as well as some temporary fixtures (Riksantikvaren's definition of a protected building).

This provides a framework within which alterations can be made. Any alterations that are to be introduced should respond to certain *values* agreed upon by the preservation discussions surrounding industrial heritage sites. Navigating through the core conflicts between preservation and change, the notions of **authenticity** (mentioned in the ICOMOS Venice-charter from 1964) **integrity**, **identity** and **reversibility** are the key points that I attempt to interpret in my project proposal **Fixed Flexibility**.

My approach seeks to *bridge values* within three different academic discourses related to preservation, as defined in the book *Industrial Heritage Sites in Transformation: Clash of Discourses* by Heike Oevermann and Harald A. Mieg. Those discourses are as follows:

Heritage Conservation: Values authenticity and integrity; concerned with preservation

Urban Development: Values vision, development, economic value and environmental value, and aims for a prosperous and livable city

Architectural Production: concerned with aesthetics and design and strives to bring forth contemporary architecture

Each of the fields above emphasize different views and interests. Dealing with transformation of industrial heritage architecture, the solution might be to set a hierarchy of values. Odda Smelting Works as a whole bears multiple important values, both historical, social and technical, as well as aesthetical. The Shell Roof is most prominent for its' **technical** and **aesthetical** qualities. Those are the ones I seek to preserve.



Fig. 6: The Shell Roof as of today (August 2020)

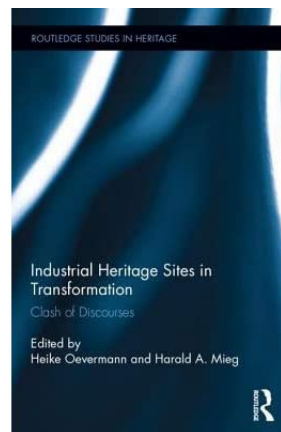
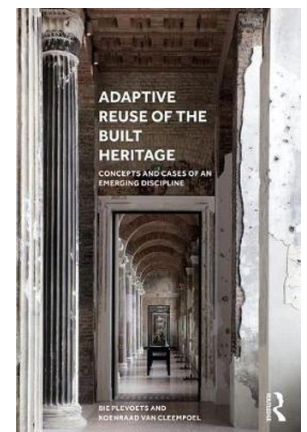


Fig. 7: Relevant literature for theoretical background



TRANSFORMATION STRATEGY: ADAPTIVE REUSE

In search for the right intervention-approach, it has been helpful to look at how other industrial heritage sites like Zeche Zollverein and C-Mine have been dealt with. The relevant book by Bie Plevoets and Koenraad van Cleempoel titled *Adaptive Reuse of the Built Heritage* presents a rough specter of alterations that a historic building or site can be subjected to, namely, renovation, adaptation, alteration, and remodeling. Renovation is one of the gentlest of approaches, while remodeling is the most drastic one.

Programmatic adaptation can feasibly be applied in case with the shell roof. The structure is protected against unnecessary physical intervention, but its' form is relatively open and doesn't require extensive alteration or remodeling in order to introduce new function. By being assigned new function, the building is **preserved through active use**.

Having said that, important factors, such as architectural form, historic context, as well as geographic location and societal/economic demands, all play a significant role when giving an obsolete building with a certain identity a second life and should therefore be considered beforehand.

VALUE-BASED PROPOSAL

My aim in this project has been to bridge different values through the reuse proposal. Responding to three different fields and their demands, uniting them under one roof.

1. Heritage conservation

Authenticity: referencing former function, no surface treatment or unnecessary restoration of the Shell Roof or the adjacent elements.

Integrity: minimal demolition of existing elements, trying to create a sense of coherency throughout the project with the added intervention. Helps protect shell roofs' identity by referencing its former dynamic use, the new program is related to the original function.

Reversibility: due to projects' construction principle, the added alterations are fully reversible and can be removed without damaging or harming the existing structure.

2. Architectural production

Aesthetics: Introducing new structure with material and formal ambition to supplement the surroundings, communicating within the same industrial language.

Image: Enhancing/ taking into consideration the existing structural logic and patterns of the shell roof, respecting its' given possibilities and limitations, creating a new symbiosis.

3. Urban development

Development: introducing modular base structure with three levels of permanence, allowing people to decide the contents within a set framework.

Economic viability: flexible construction, can be removed or added after demand, rentable spaces generate income for the owner (Smelteverk Nærings Utvikling).

Transforming parts of the roof into a potential tourist landmark (The Tightening Tower).

Bottom-up approach: allowing Odda to take ownership of the place module by module, inviting inhabitants to incrementally occupy its' multiple functions that are provided by structural flexibility, thus making parts of the structure more accessible.



Fig. 8: Project Proposal