REFLECTION PAPER

# CARGO PLUS

**The Cargo Terminal Design for Enhancing Working Conditions**

Meng Chen | 5573238

06/12/2023

# INDEX

P4 Reflection Paper

Meng Chen | 5573238

TU Delft | Architecture and the Built Environment

Complex Projects Graduation Studio

Bodies & Buildings in Berlin

# REFLECTION

# 01

## Introduction

Increasing exposure to physically and mentally demanding working conditions presents a significant problem. Nearly half of all employees encounter physically demanding conditions, with pressures from the growing global trade market amplifying these challenges (Havet et al., 2020). In addition, rapid advancements in digitalization, automation, and robotics have escalated mental stress, increasing mental fatigue and reducing job satisfaction (Meyer & Hünefeld, 2018).

Despite architects' focus on people-centered design, there is insufficient attention on enhancing strenuous work environments, resulting in poor lighting, ventilation, and insufficient rest areas, affecting workers' well-being and productivity.

It is imperative to explore how architectural design can alleviate these conditions, improving the overall work environment, and boosting productivity.

This study explores the research question: "**How can architecture design offset demanding working conditions, both functionally and mentally?**", which will be investigated through a cargo terminal design. The research is structured around three main sub-questions:

1. What are the key factors contributing to demanding working conditions?
2. How can architectural design elements and features contribute to demanding environments?
3. How can technology be integrated into architecture design to improve crew working conditions?

By identifying the factors that lead to challenging work conditions and examining architectural strategies to address both functional and mental well-being aspects, this study aims to uncover innovative design solutions that alleviate the unique challenges faced by employees in cargo terminal

## Aspect 1: The Relationship Between Research and Design

The interplay between research and design in this project manifests through the creation of an efficient, flexible, and sustainable cargo terminal at Tegel Airport. The research component involved understanding the nuances of challenging work environments and the role architecture plays in mitigating these challenges. This led to a design that is not just functional but also worker-centric, blending seamlessly with the urban fabric of the reimagined Tegel Airport site.

The design reflects extensive research into the needs of a modern cargo terminal, particularly the health and well-being of the workers. Each element, from the warehouse layout to the inclusion of public and educational spaces, is a direct response to the research findings. For instance, the specific categorization of cargo and corresponding warehouse conditions are designed keeping in mind the unique requirements for high-value, urgent, and perishable goods. This design approach ensures that the terminal is more than just a transit point for goods; it becomes a dynamic space that supports its workers and interacts positively with its urban surroundings.

## Aspect 2: The Relationship Between Graduation Topic and Studio Topic

The project's alignment with the Complex Projects studio theme 'Body, Building, Berlin' is multifaceted. It addresses the 'Body' by focusing on the physical and mental well-being of the workers, offering a design that supports their health and comfort. The 'Building' aspect is reflected in the architectural response to these human-centric needs, where functional and sustainable design principles are applied to create a cargo terminal that goes beyond traditional warehouse functionalities. The integration into Berlin's urban landscape — the 'Berlin' component — is achieved by situating the project within the broader context of the city's development, specifically the repurposing of Tegel Airport.



This approach ensures that the project is not only a stand-alone structure but an integral part of the city's evolving narrative. The harmonious blend of these three elements — Body, Building, and Berlin — underscores the project's commitment to addressing worker well-being, architectural innovation, and urban integration, thereby encapsulating the essence of the studio theme.

## Aspect 3: Research Method and Approach in Relation to the Graduation Studio

The graduation studio's structured approach, emphasizing program, client, and site, significantly influenced my project development. This holistic framework guided the design of the cargo terminal, ensuring a comprehensive understanding of its functional and contextual needs. Collaborating within the studio's economy group was pivotal, allowing us to establish site selection criteria and deepen our understanding of the project's economic aspects.

Seminars focusing on 'flow' within the studio shaped my design approach, highlighting the importance of fluidity and efficiency in architectural spaces. This understanding was critical in developing the cargo terminal's layout, ensuring operational effectiveness and adaptability to the dynamic nature of cargo operations.

A crucial component of the studio's methodology was the site visit to Berlin, offering invaluable insights into the city's atmosphere and urban context. This firsthand experience was instrumental in integrating the terminal design with its urban surroundings, ensuring the project resonated well with Berlin's landscape. The combination of collaborative studio efforts and individual exploration, culminated in a well-rounded and contextually relevant project.

## Aspect 4: Wider Social, Professional, and Scientific Relevance

The graduation project stands at a significant intersection of social, professional, and scientific relevance. Socially, it targets the improvement of working conditions in demanding environments, thereby contributing to the welfare of a crucial workforce segment. Professionally, it champions a human-centric design ethos in architecture, advocating for the integration of technology and sustainability in design practices. Scientifically, the project contributes to the expanding body of knowledge on the impact of architectural design on human health and well-being.

It combines interdisciplinary research and evidence-based design, paving the way for future explorations in how built environments can promote health and productivity. The project, therefore, transcends the traditional boundaries of architectural design, positioning itself as a pioneering effort in the intersection of architecture, occupational health, and environmental sustainability.

## Aspect 5: Ethical Issues and Dilemmas

Throughout the graduation project, one of the most prominent ethical dilemmas encountered was the balance between technological advancement and workforce implications. The move towards a high-tech warehouse design suggested a potential reduction in traditional workforce roles, raising questions about employment and the evolving nature of workspaces.

The response to this dilemma was to create shared spaces within the terminal, fostering a sense of community among different user groups, including crew members, start-up employees, and students. This approach not only maximizes the utility of the space but also addresses the issue of isolation that is often inherent in conventional warehouses.

The project, therefore, navigates these ethical considerations by envisioning a future where technology and human needs coexist in a mutually beneficial ecosystem, reflecting the complex and evolving nature of ethical decision-making in the architectural design process.



## Bibliographical References

Havet, N., Fournier, J., Stefanelli, J., Plantier, M., & Penot, A. (2020). Disparate exposure to physically demanding working conditions in France. Revue d'Épidémiologie et de Santé Publique, 68(6), 327–336. https://doi.org/10.1016/j.respe.2020.09.008

Meyer, S.-C., & Hünefeld, L. (2018). Challenging Cognitive Demands at Work, Related Working Conditions, and Employee Well-Being. International Journal of Environmental Research and Public Health, 15(12), 2911. https://doi.org/10.3390/ijerph15122911