



Construction safety: An analysis of systems failure

The case of the multifunctional Bos & Lommerplein estate, Amsterdam

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ABSTRACT

Bos & Lommer is a district in the west of Amsterdam. The new centre, consisting of the district office, 96 apartments, a few dozen businesses and shops, a two-storey parking lot with capacity for more than 500 cars, and a market place, was completed in 2004. Less than 2 years later, in July 2006, this whole multifunctional complex had to be urgently cleared, because its safety could not be guaranteed.

The investigations revealed that the planning and realisation of the Bos & Lommer complex were anything but exceptional. What happened there could have happened anywhere in the Netherlands and possibly elsewhere.

This paper analyses the decision-making process in the planning and construction of the Bos & Lommerplein estate on the basis of accident causation theories. It will ascertain which safety science methodology is best equipped to describe and analyse the events in this multifunctional estate. The analysis forms the basis for a reflection on a set of concrete guidelines for designing and constructing complex projects. Construction safety would be enhanced if the scope for improvement in decision-making on complex building projects were properly utilised.

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1. Introduction

1.1. Construction safety at risk

Real-estate development has always been fraught with risks. Public values such as safety, health, and the environment are covered by building regulations. Theoretically, in Europe the safety of real-estate development is guaranteed by European and national building regulations, but this is not how things appear to work in reality – for a number of reasons.

In this paper we examine the planning and construction process for the recently built multifunctional Bos & Lommerplein complex in Amsterdam West. The decision-making for the development of the Bos & Lommerplein complex plays a central role in this paper.

Many years ago, Peter Hall published his seminal work *Great Planning Disasters* (Hall, 1980). A great many structural disasters have occurred in the world. More in general there are many problems in the decision-making on mega-projects (Flyvbjerg et al., 2003).

On 11 July 2006, less than 2 years after its completion, the multifunctional Bos & Lommerplein in Amsterdam had to be evacuated. The district office, 27 shops and businesses, 96 apartments and a covered two-storey parking lot (over 500 places) lay empty from 11 July till 21 December 2006. The evacuation cost the municipality over 8 million euros, which it is now trying to has reclaimed from the builders.

Although there were no casualties, we argue that Bos & Lommerplein qualifies as a serious candidate for a ‘planning disaster’ status. We shall trace some aspects of the project planning and decision-making process and identify the factors that enlarged the technical risks. In our recommendations we will try to improve the planning and construction of multifunctional estates in the risk society.

We shall apply a safety science accident causation methodology. We shall provide an overview of accident causation models, make a choice and apply it to the decision-making in the multifunctional Bos & Lommer estate in Amsterdam. Although construction is a very specific sector (Ringen et al., 1995), we argue that modern accident causation models are appropriate to explain also construction accidents.

1.2. Research questions

Our research questions are:

- What has happened recently in The Netherlands in the area of structural disasters with rather new buildings (Section 2)?
- How was the decision-making in planning the Bos & Lommerplein complex? Which actors were involved and what are the key characteristics of the decision-making process (Sections 3–6)?
- Which technical problems have manifested themselves after the delivery of the Bos & Lommerplein complex (Section 7)?
- What are current accident causation models which can be used to describe, analyse and explain the systems failure at the Bos & Lommerplein (Section 8)?

- What can be concluded and recommended for the future, based on the findings on the Bos & Lommerplein complex and other recent construction failures (Section 9)?

1.3. Method

Essentially the research is based on a case study. This case reflects the current situation with the planning and construction of complex buildings in The Netherlands. By comparing this case with recent cases in The Netherlands (Section 2) it is possible to draw conclusions which stretch beyond the specific case (Yin, 2003).

One of the authors of this paper was member of the Bos & Lommerplein Investigation Commission and could study the complete files (more than 10 m) of the project. In addition, as member of the Committee, he had interviews with about 40 persons: those who were involved in the planning and/or construction of the project, and those who can be considered as experts in The Netherlands and can put the specific experience with this case in a broader context. Where we present the empirical findings of the Investigation Committee, we make mostly no difference between the findings of the Committee and those of the authors. For one theme the authors will expose an additional view. This is presented in Section 9.6 on the so-called fatal deadline.

In this paper we try to link this specific recent empirical evidence with the appropriate notions in safety science, which can be mobilised to explain systems failure in general, and in the construction industry in particular. Section 8 presents a number of accident causation models. Our scientific contribution is to show that such an accident causation model can be used to describe, analyse and explain systems failure in the construction industry. The societal contribution of this paper culminates in Section 9 where we present a number of conclusions and recommendations for the planning and construction of complex buildings in general. The added value of this paper is, we argue, the way it connects general accident causation models and current phenomena in the building industry.

1.4. Structure of the contribution

Section 2 presents the context of the case study and deals with recent building disasters in the Netherlands and shows that Bos & Lommerplein is not unique.

Section 3 describes the origins of the Bos & Lommerplein complex. This is derived from *Onderzoekscommissie Bos and Lommerplein* (2007b). Section 4 concentrates on the many changes in the functional programme. Section 5 presents the description of the project as eventually realised. Section 6 sketches the dramatic developments between the completion of the project and the emergency evacuation. Section 7 summarises the technical problems which have appeared in Bos & Lommerplein.

In Section 8 we give an overview of accident causation models which could explain our findings. Finally, in Section 9 we bring the empirical evidence, the context and the theoretical notions together and formulate conclusions and recommendations.

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