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Original Research Article

The analysis of the stages of scaffolding “life” with regard to the decrease in the hazard at building works

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ABSTRACT

The paper presents the attempts at determining the reasons for the hazardous incidents which threaten the safety of people working on scaffolds, as well as in their vicinity. The article is divided into two parts, the former referring to the information on the accident rate involving scaffoldings as well as the research on the likelihood of the occurrence of perilous situations, the inspection of their technical state and the breaches of the OSH Regulations included. The latter part is devoted to the thorough analysis on the particular stages of the scaffold operation life, the special attention being paid to the practices, errors and failures while designing scaffolding. Moreover, it concerns the selection of the scaffold elements, the assembly and disassembly of scaffolding as well as their usage which can result in an accident or a building collapse. The range of activities that contribute to the decrease in or even the avoidance of risky situations involving scaffolds is hereby presented in conclusions.

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1. Introduction

The major application of scaffolding is to support building works at heights as well as at places with poor access. The sample scaffoldings are displayed at Figs. 1 and 2. Other instances of complicated scaffolding, erected around monuments were described in the following papers [1,2]. In addition, scaffolding

is used in other fields such as renovation works of processing lines, in shipyards, as supporting constructions of billboards, a cover for mass events, a stage, constructions of temporary halls and also as decorative elements, etc. Such a wide range of applications causes the increase in the possibility of occurrence of hazardous situations related to all unforeseeable events that threaten people in the area of scaffolding. In various situations the user of scaffolding are people who have

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Fig. 1 – Façade scaffolding at building works in Lublin (Poland).



Fig. 2 – Unanchored scaffolding at Scheibler Chapel in Lodz (Poland).

no idea of the nature of their use. More importantly, scaffolds as temporary constructions on a building site are regarded as constructions of little significance; hence there is minor importance attached to their proper erection and exploitation. As a result, there may occur plenty of unpleasant incidents, above referred to as hazardous situations, including injuries of workers or other people staying in the vicinity of scaffolding, and also construction disasters of scaffolding on building sites or falling down of scaffolds outside building sites. All those incidents contribute to losses, unfortunately connected with casualties.

Since the lives and health of people is the greatest value, it seems that to the issues of health and safety in construction engineering should be paid more attention. Therefore, the aim of this paper is the classification of the stages of the scaffoldings “life” and to point out how the particular stages influence the safety of their users, including the number of accidents and the scaffolds failures. The article is the outcome of the analyses, performed by the authors on the occasion of designing of unusual scaffolds and the meetings with their users on the construction sites, including assemblers. The results of the own research were preceded in the paper by the review of the world literature on the problems of accidents, related to the use of scaffolding, scaffolding failures, and the research on scaffoldings, whose aim was to test the capacity and technical condition of scaffolding.

2. The present accident rate involving scaffolding

The problems of accidents, related to the use of scaffolding on building sites, actually occur worldwide (comp. [3–6]). According to the paper [3] in Great Britain between 1989 and 1993 there were 3738 falls from scaffolds, 1304 accidents caused by the fall of tools down of scaffolds and 345 accidents were related to the falling down of scaffolds. In line with the article [3], on the basis of analyses conducted on 62 scaffolds during the years 1997–2000, it appears that the accidents were caused by construction errors–48.4%, the lack of protective equipment–14.5%, improper foundation–6.4%, human errors–6.4%, poor technical condition of scaffolding–16.1%, construction overload–8.2%. The authors of the paper [4] present problems concerning the risk of working on scaffolds in the USA. In 2000, out of 5915 accidents on building sites in the USA, 734 were related to falls from scaffolds, where 85 accidents were directly associated with a scaffolding failure. A considerable number of accidents resulting from works on scaffolds was the stimulus for authors of paper [4] to carry out the analysis on the risk of working on such installations. The research on scaffolds in terms of its safety was performed in the nine eastern states of the US. There were 113 of scaffolds analysed, out of which 31.9% were not acceptable and posed a threat to their users as well as other people in the vicinity of scaffolds; the remaining

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