

Accidents in the construction industry in the Netherlands: An analysis of accident reports using Storybuilder

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Abstract

As part of an ongoing effort by the Ministry of Social Affairs and Employment of the Netherlands, a research project is being undertaken to construct a causal model for occupational risk. This model should provide quantitative insight into the causes and consequences of occupational accidents. One of the components of the model is a tool to systematically classify and analyse reports of past accidents. This tool ‘Storybuilder’ was described in earlier papers. In this paper, Storybuilder is used to analyse the causes of accidents reported in the database of the Dutch Labour Inspectorate involving people working in the construction industry. Conclusions are drawn on measures to reduce the accident probability. Some of these conclusions are contrary to common beliefs in the industry. © 2007 Elsevier Ltd. All rights reserved.

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1. Introduction

Abbreviations: AR, Accident report (*ongevalsrapport*); CN, Zaaknummer; DLI, Dutch Labour Inspectorate (*Arbeidsinspectie*); EO, Economical Offence (*Economisch Delict*); GISAI, Occupational Accident Database of the Labour Inspectorate of the Netherlands: GISAI (*Gemeenschappelijk Informatie Systeem Arbeidsinspectie*); DLOC, Decree/Law on Occupational Safety (*Arbeidsomstandighedenbesluit/Arbeidsomstandighedenwet*); FR, Fine Report (*Boeterapport*); RI, Report of Investigation (*proces verbaal*); RP, Reportable (*meldingsplichtig*); TR, Telephone Report (*telefonische melding*)

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In previous papers [1,2], it was described how Storybuilder was constructed as part of the development of an Occupational Risk Model (ORM). This model is now complete [3,4]. It uses amongst other things data extracted from the Occupational Accident Database of the Labour Inspectorate of the Netherlands: GISAI (*Gemeenschappelijk Informatie Systeem Arbeidsinspectie*). In this paper, how the data pertinent for the ORM were selected from the larger GISAI database is first described. Subsequently, the case of accidents in the construction industry is presented. It is shown that even without data on exposure of workers to hazards in this industry, conclusions can be drawn with respect to the causes of accidents and the actions that may contribute

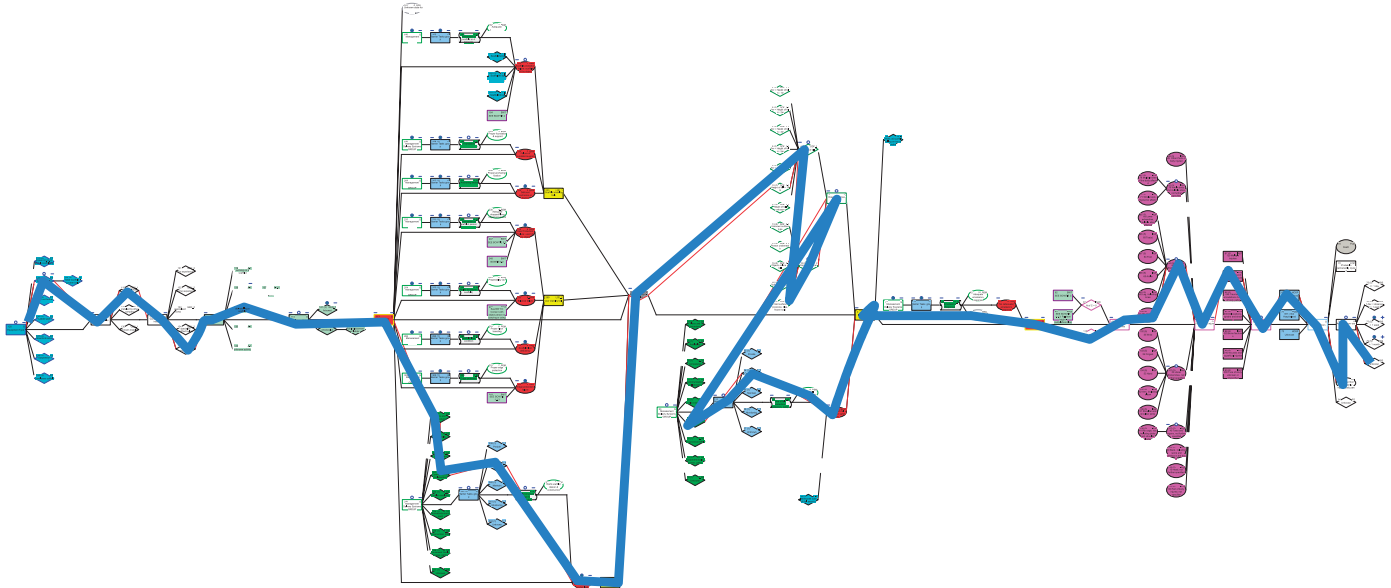


Fig. 1. Storybuild (Bow-Tie) with accident path.

more likely to the reduction of the probability of an accident of this type. This type of analysis is restricted to situations in which the reporting period is the same for all accidents concerned and the exposed population is the same. In that case the order of importance does not change whether a comparison is made on the basis of accident numbers or of risk. As soon as reporting periods or the exposed population differ, exposure data are indispensable. Further work is ongoing in the development of ORM to obtain exposure data by a nation-wide survey of the workforce.

As described in the previous paper [1], accidents through Storybuilder are each represented by a path through a formal structure of cause and consequence also called a Storybuild.

Although the analysis of accident data was primarily aimed at getting the data for building and quantifying the Bow-Ties in the ORM [5], the Storybuilds also provide a whole world of insights into the structure of occupational accidents, or at least the structure of those accidents that have been reported. For the convenience of the reader, the next section has a short summary of the Storybuilder and the underlying concept of the Bow-Tie. A full description can be found elsewhere [1–3].

2. Storybuilder

Storybuilder is based on the concept of the Bow-Tie, which was as far as is known originally conceived by ICI.¹ In the Bow-Tie a type or class of accidents is developed and has to the left its causes and to the right its consequences. The shape of the resulting figure resembles a bow-tie, hence the name. It can also be seen as a fault tree and an event

tree connected by their top event. Each box in a Bow-Tie is an event or condition that can happen/true or not happen/false.

Storybuilder is used to generate such a Bow-Tie. However, because in the ORM the term Bow-Tie has connotations that go beyond the structure resulting from this analysis [5] the structure is called a storybuild. Using the Storybuilder, each accident is analysed for the chain of events and the structure of the Bow-Tie is built, event by event, accident by accident, until the structure for a whole class of accidents is generated. Each pathway through the storybuild represents an accident that has happened. Once the storybuild is constructed, new pathways can be found, which represent accidents that have not happened yet, but could happen as a result of a particular combination of events, individual events of which have happened before but not in that particular combination. The storybuild can also be examined for pathways that are common for several accidents, which may indicate a possible line of defence against a repeat of past accidents or against future accidents. If there are enough accidents of a certain class in the storybuild, statistical analysis is possible of the whole of the structure. Storybuilder provides automatic features to do so. Fig. 1 gives an example of a storybuild and indicates a single accident pathway.

3. GISAI

The Dutch Labour Inspectorate (DLI) stores all correspondence about occupational accidents in GISAI. At the time of carrying out the analyses, data were available for 22,892 occupational accidents that were reported between 1 January 1998 and 4 March 2004.

¹ICI, Plc Hazan Course Notes 1979.

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