

OVERVIEW OF ACCIDENT FREQUENCIES IN STORYBUILDER

ACCIDENTS ANALYSED

In 2004-2006 a team was formed for the sole purpose of analysing occupational accident investigation reports made available by the Dutch Labour Inspectorate. In this period the software StoryBuilder was developed to support the development of an events structure. Horrible stories (accidents) were analysed in order to build structures according to strict building rules.

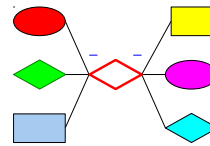
This went through a process of first and second pass development and checking. At the end of the first pass the event structure was frozen. In the second pass it was filled with all the available data from the specified time period.

The accidents analysed (9142) are reportable occupational accidents¹. Employers are obliged to report serious occupational accidents to the Dutch Labour Inspectorate (Arbeidsinspectie). Sometimes this does not happen and the accident is either not notified at all or brought to the attention of the Labour Inspectorate by police, insurance companies or victims. Accidents are reportable according to article 9 of the Dutch Working Conditions Act (Arbowet 1998) if they are occupational accidents resulting in serious physical or mental injury or death within one year. A physical injury is considered to be serious if the victim is hospitalised within 24 hours and for at least 24 hours or the injury is permanent whether or not the victim is hospitalised. A reportable accident has to be reported within 24 hours. Then there are also criteria concerning whether an injury is permanent or not (physically or mentally).

GISAI (Geïntegreerd InformatieSysteem ArbeidsInspectie) is the Dutch Labour Inspectorate management system for occupational accidents. The Dutch Labour Inspectorate stores all correspondence about occupational accidents in GISAI. Data was available on 22,892 occupational accidents that were reported between 1 January 1998 and end February 2004. 10,237 of these had no offence or investigation report and were not analysed. The main reason why there was no report was that they were not reportable (82% of the accidents without report). The other cases were waiting to be investigated or were under investigation or too sensitive to be made available.

Only accidents with reports could be used for detailed analysis of causes. There are different kinds of reports and only if a breach has been found is the report complete with respect to witness statements and injury classes. If there is no breach report then there is a summary of the investigation findings and the reason why it is not a breach. The latter were also analysed but contain less information. If the conclusion is that the accident was not an occupational accident e.g. natural death or suicide then these were not included in the analysis.

¹ A few cases that were investigated turned out not to be reportable but they still give a lot of information about how accident happen so they were included



There are also limitations on which occupations appear in GISAI e.g. self employed are excluded unless they are working under the authority of another company. Also excluded are occupational accidents occurring in air transport for flying aircraft, for cabin personnel on stationary aircraft. Loading/unloading and other non-cabin staffs are included as are cabin personnel outside the aircraft. Oil and gas exploration is also excluded. All other drilling for scientific research, geothermal energy, groundwater accidents are covered by the Labour Inspectorate. Shipping – all accidents while building repairing maintaining or cleaning ships are included, and loading and unloading is only in the Labour Inspectorate database if the crew is not involved. Railway accidents are in principle included, but really serious incidents with collision and electrocution are done together with another inspectorate which means the investigation is not in the GISAI database... If a pupil of any school/university has an accident it is considered a labour accident where the teacher or school can be held responsible after the investigation. Military is included other than in wartime. Passers by or trespassers on worksites during working hours are included. Accidents to illegal workers, foreigners etc working on Dutch soil are included – the company is obliged to report them.

An accident is an occupational accident if it occurs at the workplace working during work.

Underreporting for serious occupational accidents is considered to reach 50%. The underreporting % cannot be distributed evenly across the 3 categories of consequences (death, permanent injury, recoverable injury).

9142 reported investigated accidents of the Dutch Labour Inspectorate have been analysed. These accidents are distributed across 36 Storybuilds, graphical structures in the software StoryBuilder each representing a type of occupational accident, characterised and named in each case by the release of the hazard agent or *centre event* of a bowtie of causes and effects.

The analysed accidents occurred between 1998 and end February 2004 inclusive except for 03.1 Contact with falling objects cranes, 03 Contact with falling objects not cranes, and 08.1 Contact with moving parts of machine, where only accidents between 2002 to 2003 were analysed.

The following table gives the number of accidents per Storybuild centre event from most to least frequent accident type.

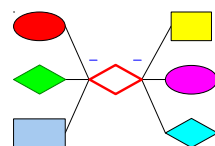
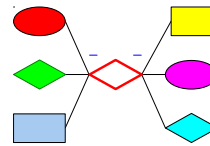
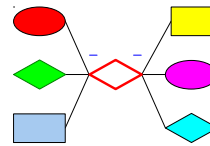


TABLE 1 GISAI ACCIDENTS WITH INVESTIGATION AND/OR OFFENCE REPORT

Frequency Order	StoryBuild Number	StoryBuild Name	Years analysed: 1998-Feb 2004	Years analyse : 2002-2003	Description	% of total per year	Total Accidents analysed	Accidents per year
1	8.1	Contact with moving parts of machine		x		20.96%	797	398.5
2	1.1.3	Fall from height - roof/platform/floor	x			9.36%	1099	178
3	1.1.1	Fall from height ladders	x			9.10%	1069	173
4	3.2	Contact with falling objects NOT cranes		x	The object drops/falls/collapses due to gravity and person not on the structure is harmed by the falling structure. Does not involve cranes or crane parts	8.89%	337	169
5	2	Struck by moving vehicle	x		Victim is outside vehicle	4.68%	550	89
6	1.1.2	Fall from height scaffold	x			4.52%	530	86
7	11	In or on moving vehicle with loss of control	x			4.47%	522	85
8	1.2	Fall on same level	x			3.52%	416	67
9	4	Contact with flying/ ejected objects	x		Includes objects ejected by mechanical impact, by a machine or other energy sources (wind, air, thrown by man).	3.31%	390	63
10	3.1	Contact with falling objects - cranes		x	Either it is the hoisted load that falls, and/or the hoisted load that hits another object that falls, or it is a collapsing/ turning over crane that falls.	2.68%	102	51
11	8.3	Trapped between/ against	x		Between a machine as a whole (or major part) and an object (including construction parts such as walls, sliding doors, etc.) or between machines or between objects if moved by a machine/ vehicle.	2.68%	312	51
12	1.1.5.3	Fall from height - working on height unprotected	x			2.42%	286	46
13	6	Contact with object used/ carried	x		e.g. Can be hit by object carried by self or by other person. But if it is a hand held tool operated by self go to 7.	2.10%	247	40
14	15	Loss of Containment from normally closed	x			2.10%	244	40
15	7	Contact with handheld tools	x			2.00%	234	38



Frequency Order	StoryBuild Number	StoryBuild Name	Years analysed: 1998-Feb 2004	Years analyse : 2002-2003	Description	% of total per year	Total Accidents analysed	Accidents per year
16	8.2	Contact with swinging/hanging objects	x		Contact refers to contact of body (part) with these swinging or moving loads or (hanging) objects including jip, hanging loads, counterweight/ upperworks.	2.00%	232	38
17	1.1.5.2	Fall from height - non-moving vehicle	x		NB: no falls from: A) special designed working platforms (with edge protection) on vehicle (like on cranes). These are part of 1.1.3 (Falls from roof/floor/platform). B) fixed ladders or lifts on vehicles. These are part of 1.1.1.x or 1.1.5.1	1.74%	205	33
18	1.1.5.1	Fall from height - moveable platform	x			1.63%	191	31
19	12	Contact with electricity	x			1.63%	190	31
20	27	Explosion	x			1.32%	157	25
21	17	Fire	x			1.21%	144	23
22	14.1	LoC's Open containments	x		Outside open containment	1.21%	141	23
23	9	Moving into an object	x		Includes walking, jumping into, blown into, thrown into or otherwise moving into an object (blunt or sharp), while contact is not intended.	1.10%	127	21
24	1.3	Fall down stairs or ramp	x			1.05%	121	20
25	5	Hit by rolling/sliding object and person	x			0.84%	100	16
26	14.2	Contact with hazardous substance without LOC	x		i.e. eye/ skin contact, inhalation, ingestion	0.79%	90	15
27	1.1.4	Fall from height - hole in the ground	x			0.63%	75	12
28	20.1	Victim of Human Aggression	x		Deliberate harm was intended by physical contact. Contact can be direct (hit, bite, kick) or indirect (shot, cut, crushed against/ between, etc.). Also includes cases of hostile, injurious or destructive behaviour when caused by frustration.	0.58%	66	11
29	25	Extreme muscular exertion	x		I.e. overload of the human body as a result of sudden and extreme muscular exertion.	0.32%	38	6
30	20.2	Victim of animal behaviour	x		includes fall from animals.	0.26%	32	5
31	22.1	Contact with hazardous atmosphere in confined space	x		Main issue here is that workplace is confined. Excluded are accidents of direct contact (skin, oral, inhalation) with hazardous substances (14.2) in non-confined places.	0.26%	30	5



Frequency Order	StoryBuild Number	StoryBuild Name	Years analysed: 1998-Feb 2004	Years analyse : 2002-2003	Description	% of total per year	Total Accidents analysed	Accidents per year
32	23	Impact by immersion in liquid	x		Meant here is the moment at which a harmful effect to the human body by immersion underneath water/ or another liquid starts.	0.26%	28	5
33	10	Buried by bulk mass	x			0.16%	17	3
34	13	Contact with extreme hot or cold surfaces or open flame	x		Including heat radiation of extreme hot surface	0.11%	11	2
35	22.2	Contact with hazardous atmosphere through breathing apparatus	x			0.05%	9	1
36	24	Too rapid (de)compression	x		Occurs while diving	0.03%	3	0.5
TOTAL						100.00%	9142	1901