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**FACTORS THAT PROMOTE ZERO
FATALITIES, INJURIES, AND DISEASE
IN CONSTRUCTION**

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Background – 1

- The idea that **accidents, fatalities, injuries, and diseases** should be reduced to zero is gaining traction now
- Industrial H&S research defines a **'safe'** work site as one where injuries and fatalities constitute **'zero'** sum
- However, this target is elusive in construction:
 - ✓ In South Africa, **8 318 accidents** in 2015 indicts the industry
 - ✓ These accidents led to **65 fatalities** and **715 permanent disabilities**, which in turn, contributed **67 877 lost days** in 2015 (Federated Employer's Mutual Assurance (FEM), 2016) (insures approximately 50% of the industry)
- Overall South African construction industry (cidb, 2009):
 - ✓ The disabling injury incidence rate (DIIR) is 0.98 / 100 workers
 - ✓ The fatality rate per 100 000 workers is 25.5

Background – 2

- Improved H&S performance goals should eliminate **hazards** and **accidents** in construction
- In terms of a socio-technical environment, multiple **incident** and **accident** causations are a major hurdle in construction
- This is explained in the BP accident which occurred in an industry where large organizations are committed to goals in the form of '**zero harm**', and '**zero accident vision (ZAV)**'
- Even in less sophisticated industries, accident causation has multiple pathways

Background – 3

- **Setting goals is not enough in a socio-technical environment:**
 - ✓ **As a result of insufficient H&S policies, standards, procedures, and the accountability system, which are insufficient**
- **The negative effects of setting goals may be influenced by:**
 - ✓ **Excessive measurement**
 - ✓ **Erudite data computations**
 - ✓ **High bureaucratic systems**
- **But, we have to find a way out of the ‘Zero’ logjam!**

Background – 4

South African scenario:

■ The ‘Big Five’:

- ✓ **Aveng Grinaker-LTA: Home Without Harm Everyone Every Day**
- ✓ **Group Five: Stop for Safety Zero Harm**
- ✓ **M&R: Stop. Think. Act. 24 / 7**
- ✓ **Stefanutti Stocks: Our approach goes further than achieving our safety objectives with a zero-harm philosophy**
- ✓ **WBHO: We strive for a work environment that achieves ‘zero harm’**

■ Other:

- ✓ **Liviero: L.I.F.E. Liviero Incident Free Environment**
- ✓ **NMC: A key focus is the realisation of our No Harm philosophy through instilling a culture of safety**

Problem

- **Problem:**
 - ✓ **The goal of zero fatalities, injuries, and disease is not a reality at both industry and organisation levels, and as such, interventions that are beyond compliance-based H&S are required in South Africa**
- **Research questions:**
 - ✓ **'How important are the following actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction', and**
 - ✓ **'To what extent do you disagree / agree with statements relative to construction H&S'**

Research Method

- **Literature survey:**
 - ✓ **To determine what can be learned from contractors in terms of using zero targets to eliminate fatalities and injuries in South Africa construction**
- **Research design:**
 - ✓ **A convenience sample was used for the survey**
- **Data collection**
 - ✓ **12 general contractors (GCs) were included in the survey**
 - ✓ **The MD or H&S coordinator in the respective firms circulated the questionnaire**
 - ✓ **A combination of both closed-ended and open-ended questions was used**
 - ✓ **92 responses were received**

Research Findings -1

- Insights from literal (general) comments include:
 - ✓ “Zero fatalities, injuries and diseases are achievable, but only if you have **the commitment from your organisation and your labour force** and that should also include your **subcontractors** and their management.”
 - ✓ “The 'basic' H&S 'guideline' that is currently seen as acceptable on South African sites is not strict enough to **guarantee zero fatalities, injuries, and disease even if planned correctly**. This is because H&S will always be planned up to what is acceptable as per the company's H&S file. Anything more will be seen as slowing down production and a waste of company money. Unfortunately H&S will always come at a cost, whether its money or statistics.”

Research Findings - 2

for tomorrow

Action / Belief / Intervention / Practice / State	Response (%)						MS	Rank
	Un- sure	LeastVery						
		1	2	3	4	5		
People are our most important resource	0.0	0.0	1.1	4.3	8.7	85.9	4.79	1
A goal of 'Zero harm'	0.0	0.0	0.0	3.3	20.7	76.1	4.73	2
A mission of 'continuous improvement'	0.0	0.0	0.0	4.4	19.8	75.8	4.71	3
A goal of 'Zero accidents'	0.0	0.0	1.1	3.3	25.0	70.7	4.65	4
A goal of 'Zero incidents'	0.0	1.1	1.1	3.3	21.7	72.8	4.64	5
Consciousness and mindfulness	1.1	0.0	0.0	6.6	27.5	64.8	4.59	6
H&S management system	0.0	0.0	0.0	3.3	35.2	61.5	4.58	7
Respect for people	0.0	0.0	1.1	8.8	20.9	69.2	4.58	8
Design hazard identification and risk assessments	0.0	0.0	0.0	4.3	34.8	60.9	4.57	9
Construction hazard identification and risk assessments	1.1	0.0	1.1	3.3	33.7	60.9	4.56	10
A vision of a 'Fatality, injury, and disease-free work place'	0.0	2.2	0.0	5.4	26.1	66.3	4.54	11
Core competencies e.g. values, aptitude, and integrity	1.1	0.0	2.2	7.7	29.7	59.3	4.48	12
Conformance to requirements	0.0	1.1	0.0	7.6	34.8	56.5	4.46	13

Table 1: Importance of 13 / 38 actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction (MS: 1.00 – 5.00).

Research Findings - 3

Statement	Response (%)						MS
	Unsure	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
H&S does not happen by chance, it must be planned	1.1	2.2	0.0	1.1	35.2	60.4	4.53
The goal of 'Zero fatalities, injuries, and disease' is an integral part of H&S culture	0.0	0.0	0.0	3.3	48.9	47.8	4.44
The goal of 'zero fatalities, injuries, and disease' complements the vision of 'A fatality, injury, and disease free workplace'	2.2	0.0	0.0	1.1	57.1	39.6	4.39
The vision should be 'A fatality, injury, and disease free workplace'	0.0	0.0	2.2	3.3	50.5	44.0	4.36
'Zero fatalities' is achievable	0.0	0.0	5.6	1.1	53.3	40.0	4.28
The goal of 'Zero fatalities, injuries, and disease' is a pre-requisite for optimum H&S performance	0.0	0.0	2.2	10.0	53.3	34.4	4.20
'Zero accidents' is achievable	0.0	0.0	11.1	4.4	56.7	27.8	4.01
'Zero injuries' is achievable	0.0	0.0	10.0	6.7	57.8	25.6	3.99
Accidents are unplanned events	0.0	5.5	6.6	5.5	50.5	31.9	3.97
Hazards and associated risk can be quantified	0.0	3.3	4.4	12.1	57.1	23.1	3.92
'Excusitis' (the proffering of excuses) marginalises H&S	8.0	3.4	8.0	6.8	52.3	21.6	3.88

Table 2: Respondents' degree of concurrence with 11 / 21 statements relative to construction H&S (MS: 1.00 – 5.00).

Research Findings - 4

- **Factor analysis factors (Importance of):**
 - ✓ **Factor 1: People, planning, competencies, and management systems**
 - ✓ **Factor 2: Zero (targets)**
 - ✓ **Factor 3: Procurement, pre-planning, management systems, and tertiary built environment education**
 - ✓ **Factor 4: Client interventions, designer interventions, procurement, and construction HIRAs**
 - ✓ **Factor 5: Design HIRAs, management systems, and H&S education and training**
 - ✓ **Factor 6: People, integration of design and construction, and consciousness and mindfulness**

Research Findings – 5

Action / Belief / Intervention / Practice / State	Loading / Factor					
	1	2	3	4	5	6
The belief 'All accidents are preventable'	.007	.289	.127	.083	-.148	.192
The belief 'Accidents are failures of management'	.115	-.127	-.056	.057	-.109	.191
Respect for people	.378	.170	-.005	-.114	.018	.200
People are our most important resource	.443	.281	.152	.051	.041	.423
A vision of a 'Fatality, injury, and disease-free work place'	.045	.433	-.024	.043	.022	.082
A goal of 'Zero deviations'	-.100	.452	-.119	-.056	-.138	.179
A goal of 'Zero incidents'	.014	.737	-.067	-.032	.033	-.190
A goal of 'Zero accidents'	-.002	.857	-.063	-.112	-.006	-.150
A goal of 'Zero harm'	.000	.834	.015	-.221	.014	-.077
A mission of 'continuous improvement'	.200	.265	-.199	-.037	-.097	.253
The practice 'H&S is a value, not a priority'	.033	-.087	-.232	-.030	-.055	.165
Client focus on H&S	-.001	.142	-.098	-.701	.045	-.003
Client H&S requirements	.107	.062	.041	-.823	.065	-.111
H&S specifications	.139	.063	-.067	-.737	-.007	-.106
Designing for construction H&S	.054	.032	-.063	-.557	-.028	.149
Design hazard identification and risk assessments	.008	-.008	.128	-.641	-.416	.073
'Design and construction' method statements	.061	.058	-.248	-.264	-.436	.226
Integration of design and construction	-.067	.087	-.310	-.438	-.029	.424
Constructability / Visualisation	-.036	.061	-.216	-.596	-.015	.397

Table 3A: Pattern matrix for the importance of actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction (yellow = significant).¹³

Research Findings – 6

Action / Belief / Intervention / Practice / State	Loading / Factor					
	1	2	3	4	5	6
Appropriate procurement system	-.117	.175	-.765	-.185	.061	.028
Appropriate conditions of contract	.146	.003	-.515	-.491	.181	.057
Project duration	.018	-.066	-.549	-.148	.145	.069
Construction hazard identification and risk assessments	.055	-.053	.013	-.458	-.271	-.019
Pre-tender planning	.246	.071	-.656	-.058	.134	.231
Pre-contract planning	.505	.052	-.500	.096	.052	.090
Adequate financial provision for H&S	.620	-.095	-.035	-.121	-.070	.100
Construction Management competencies	.764	-.155	.097	-.155	-.008	.019
Core competencies e.g. values, aptitude, and integrity	.493	.125	-.267	.075	-.022	.162
Quality management	-.029	.146	-.717	.021	-.307	-.036
Quality Management System	.047	.127	-.733	.035	-.363	-.162
Environmental management	.495	.000	-.514	-.101	-.091	-.172
Environmental management system	.561	.068	-.478	.018	-.127	-.211
Conformance to requirements	.755	.160	.109	-.155	-.169	-.122
H&S management system	.395	.093	-.060	-.267	-.446	-.133
Consciousness and mindfulness	.119	.007	.046	-.230	-.148	.501
Tertiary education (all built environment) that includes construction H&S	-.016	.043	-.595	-.049	-.231	-.075
H&S education – Short Learning Programmes	-.006	.110	-.066	-.068	-.644	.033
H&S training – Workshops and Seminars	.196	-.052	-.122	-.049	-.688	.083

Table 3B: Pattern matrix for the importance of actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction (yellow = significant).¹⁴

Summary - 1

The following are 'critical' in terms of achieving zero fatalities, injuries, and disease:

- ✓ Core competencies e.g. values, aptitude, and integrity
- ✓ H&S education (tertiary built environment) and training
- ✓ People are the most important resource and respect for them
- ✓ Pre-planning
- ✓ Procurement
- ✓ Client focus on H&S
- ✓ Designing for construction H&S
- ✓ Integration of design and construction
- ✓ H&S and other management systems
- ✓ Vision – zero fatalities, injuries, and disease
- ✓ Goal – zero deviations, incidents, accidents, fatalities, injuries, and disease

Summary - 2

- ✓ **Hazard identification and risk assessments (HIRAs) – design and construction**
- ✓ **Consciousness and mindfulness**

Conclusions – 1

- The concept of '**zero**' should be a necessity for H&S management so as to improve construction practice
- People should be the **most important resource** in an enterprise, and zero harm, incidents, and accidents that are anchored on '**respect for people**' and '**continuous improvement**', should be viewed as very important for a worksite in construction
- **Zero fatalities** should be pursued in the industry despite the 2014 statistics showing that 54 fatalities occurred in South African construction (approximately 50% of the industry) and the overall fatality rate of 25.5 / 100 000 workers and a DIIR of 0.98

Conclusions – 2

- H&S programme helped a leading civil engineering firm "to achieve an almost unprecedented zero accident rate, and place the company in the top 1 percent of the UK construction industry for safety."
- A key lesson learnt on the road to the zero target achievement is the example that training was instrumental in overcoming challenges:
 - ✓ The pursuit of the zero goals, which may appear to be difficult, could promote sustained efforts for a steady reduction in lost time injuries / lost days of productive work

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