

SAPOA PORT ELIZABETH BREAKFAST SEMINAR

**PORT ELIZABETH
19 MAY 2016**

**THE ROLE OF PROPERTY DEVELOPERS, OWNERS, AND MANAGERS IN
CONSTRUCTION HEALTH AND SAFETY (H&S)**

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Introduction

- **Clients initiate projects**
- **Clients occur 'upstream' of project managers and designers**
- **Incentive to contribute:**
 - **Reduced cost of construction**
 - **Avoidance of negative publicity**
 - **No disruption to processes (alterations or extensions)**

Greenacres Shopping Centre ceiling collapse, Port Elizabeth (July, 2000)



(Eastern Province Herald, 2000)

Kolonnade Shopping Centre roof collapse, Pretoria (December, 2001)



(The Star, 2001)

Suspended scaffold collapse, Hillbrow (February, 2001)



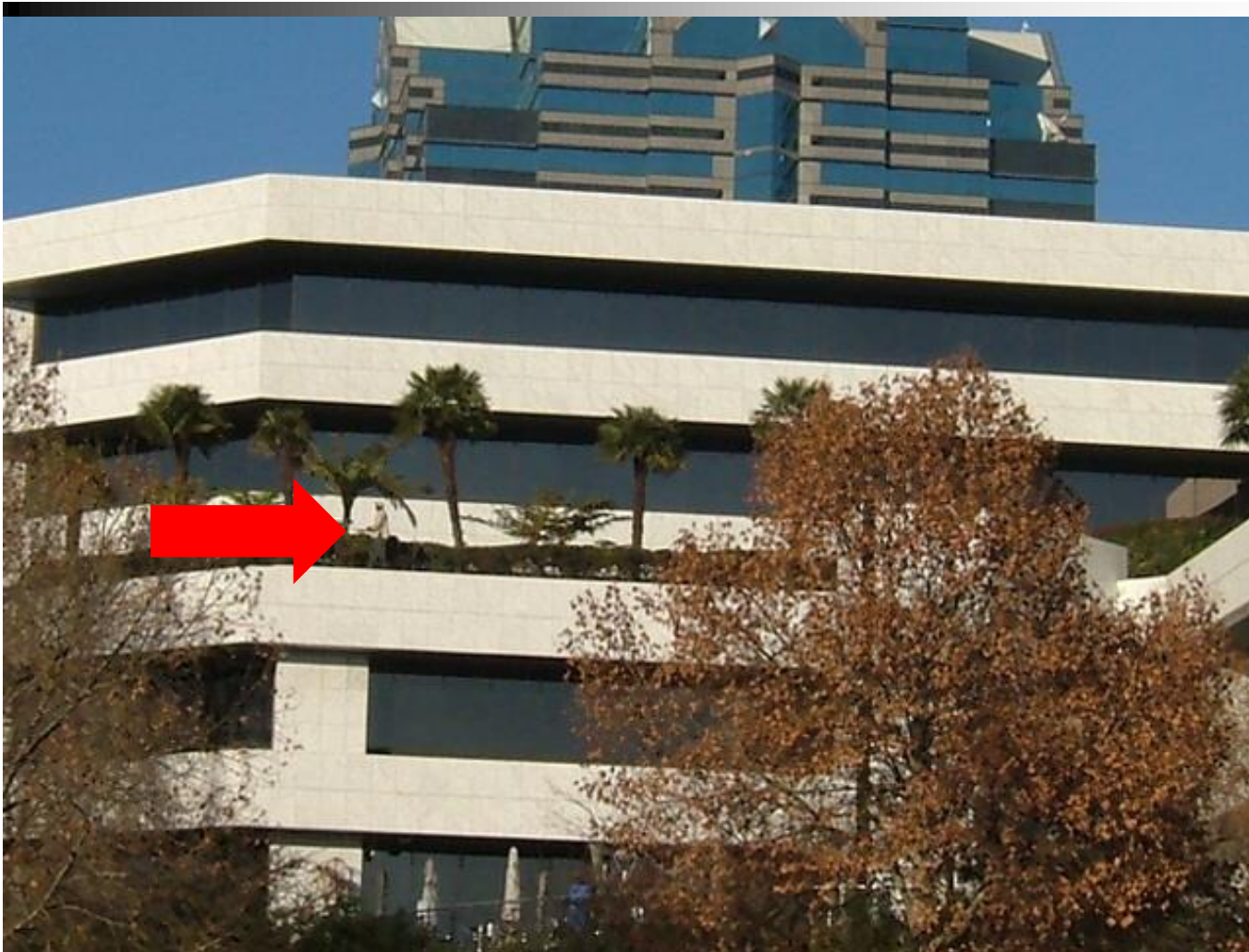
(Safodien, 2001)

Maintenance (1)



(Smallwood, 2005)

Maintenance (2)



(Smallwood, 2005)

Maintenance (3)



Window cleaning (Deacon, 2010)

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Impact of 'accidents' (1) (Public pain)



M1 Highway Temporary Bridge collapse, Johannesburg, 14 October 2015 (Reuters)

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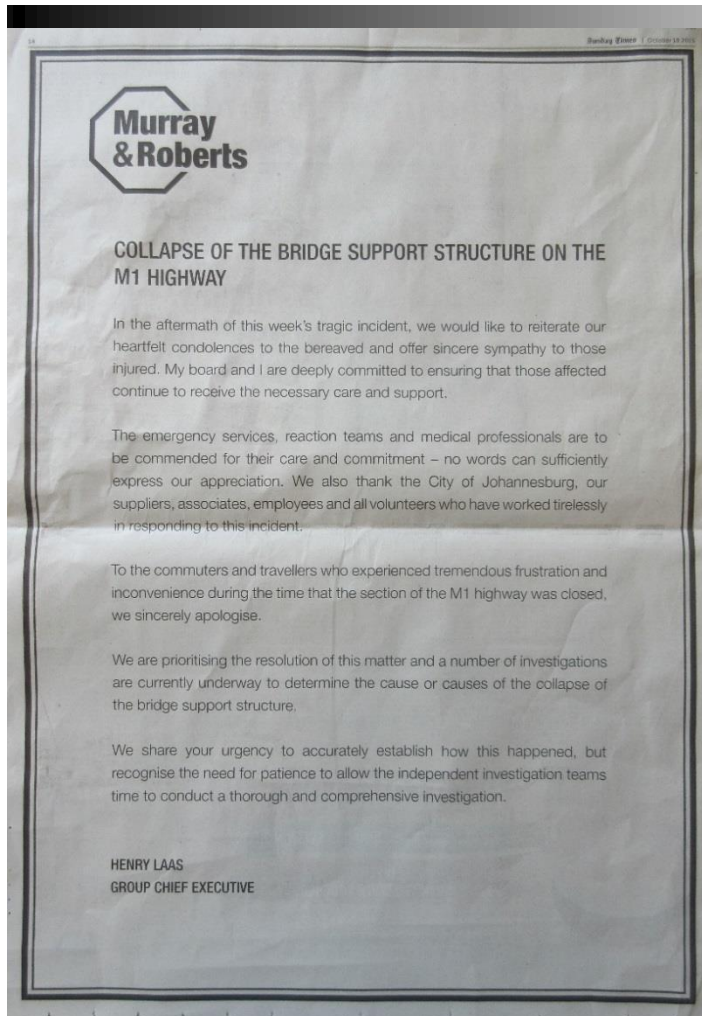
Impact of 'accidents' (2) (Media ridicule)



**M1 Highway Temporary Bridge collapse, Johannesburg, 14 October 2015
(Sunday Times, 2015)**

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Impact of 'accidents' (3) (Damage control)



Impact of 'accidents' (4) (Share holder 'pain')

- **M1 Motorway, Johannesburg, temporary bridge collapse:**
 - Immediately after the incident on Wednesday afternoon the company's share price dropped sharply by 7.32% to R11.15, leaving it 48.37% lower than a year ago (Slabbert, 2015)

Construction H&S – the macro environment

Construction H&S occurs in a macro environment:

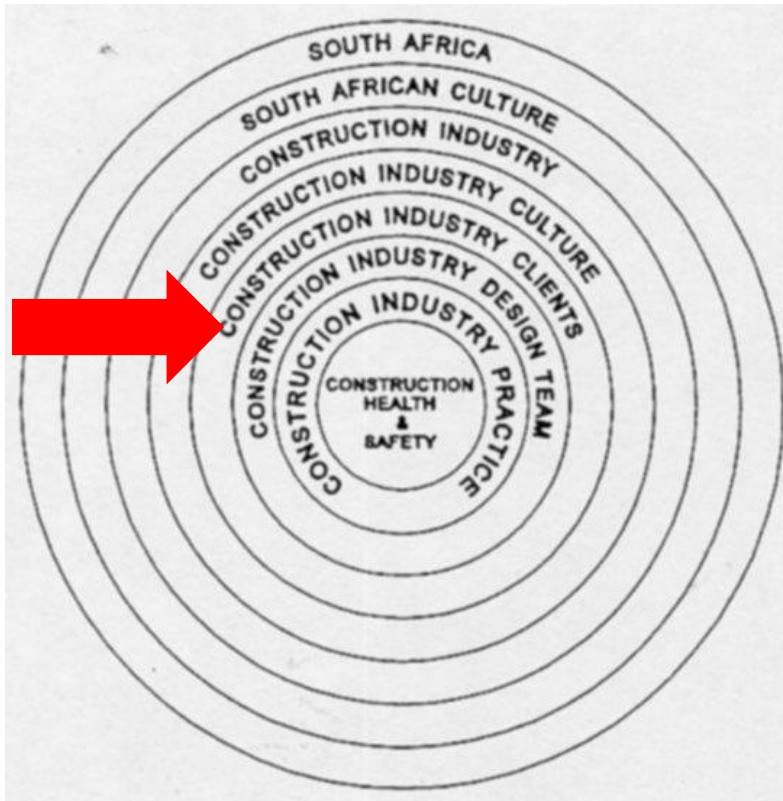


Figure 1: Construction H&S – the macro environment (Smallwood, 1995)

Injury statistics

- According to the Construction Industry Development (cidb) (2009), during visits to 1 415 construction sites by Department of Labour (DoL) inspectors:
 - 1 388 notices were issued, of which were:
 - 86 (6%) improvement notices
 - 1 015 (73%) contravention notices
 - 287 (21%) prohibition notices
 - Furthermore, 52.5% of contractors were non-compliant
- The disabling injury frequency rate (DIIR) is a rate, per 200 000 hours worked, of disabling injuries due to all causes i.e. per 100 workers x 2 000 hrs / yr:
 - 0.98 (cidb, 2009)
- Fatality rate per 100 000 workers: 25.5 (cidb, 2009)

Total cost of accidents

- Based upon the value of construction work completed in the year 2002, namely R 56 343m (South African Reserve Bank, 2003) the total COA could have been between 4.3% (R 2 401.2m / R 56 343m), and 5.4% (R 3 041.5m / R 56 343m) (Smallwood, 2004 in cidb, 2009)
- Cost of prevention is between 0.5% and 3% (Smallwood, 2004 in cidb, 2009)

Impact of inadequate H&S

Aspect	Response (%)
Productivity	87.2
Quality	80.8
Cost	72.3
Client perception	68.1
Environment	66.0
Schedule (Time)	57.4

Table 1: Aspects negatively affected by inadequate health and safety according to project managers (Smallwood, 1996).

95.8% stated that inadequate or the lack of H&S increases overall project risk

Financial implications of H&S performance (1)

- **Facts:**

- Compensation insurance (CI) = R2.20 / R100.00 wages (building)
- Claims ratio (CR) =
$$\frac{\text{CI claims}}{\text{CI assessments}}$$

- **Rebates and loadings:**

- 50% = 10.0% Rebate
- 24% = 36.0% Rebate
- 75% = 16.0% Loading
- 100% = 75.0% Loading

Financial implications of H&S performance (2)

- Based upon:

- Wages = 27% of turnover
- Therefore per R1m turnover, CI assessments are:

$$1\ 000\ 000 \times 0.27 = R270\ 000 \times \frac{100.00}{102.20}$$

$$= \frac{(R264\ 188)}{R\ 5\ 812\ \text{CI assessments}}$$

- Indirect costs = 7 / x Direct costs
(+/- 50% of 14.2 / x direct)

- Known:

- Direct costs = CI claims (% of CI assessments)

Financial implications of H&S performance (3)

Cost	Contractor		
	A	B	C
CR	50%	75%	100%
CI assessments (Rs)	5 812	5 812	5 812
CI claims (Rs)	2 906	4 359	5 812
Indirect cost (Rs) (7 / x direct cost)	20 342	30 513	40 684
Total COA (Rs)	23 248	34 872	46 496

Table 2: Total cost of accidents (COA) scenarios for contractors with differing CRs per R1m turnover

Financial implications of H&S performance (4)

Turnover (Rm)	Contractor			
	A	B	C	A-C
1	23 248	34 872	46 496	23 248
10	232 480	348 720	464 960	232 480
50	1 162 400	1 743 600	2 324 800	1 162 400
100	2 324 800	3 487 200	4 649 600	2 324 800
500	11 624 000	17 436 000	23 248 000	11 624 000
1 000	23 248 000	34 872 000	46 496 000	23 248 000
1 500	34 872 000	52 308 000	69 744 000	34 872 000
2 000	46 496 000	69 744 000	92 992 000	46 496 000

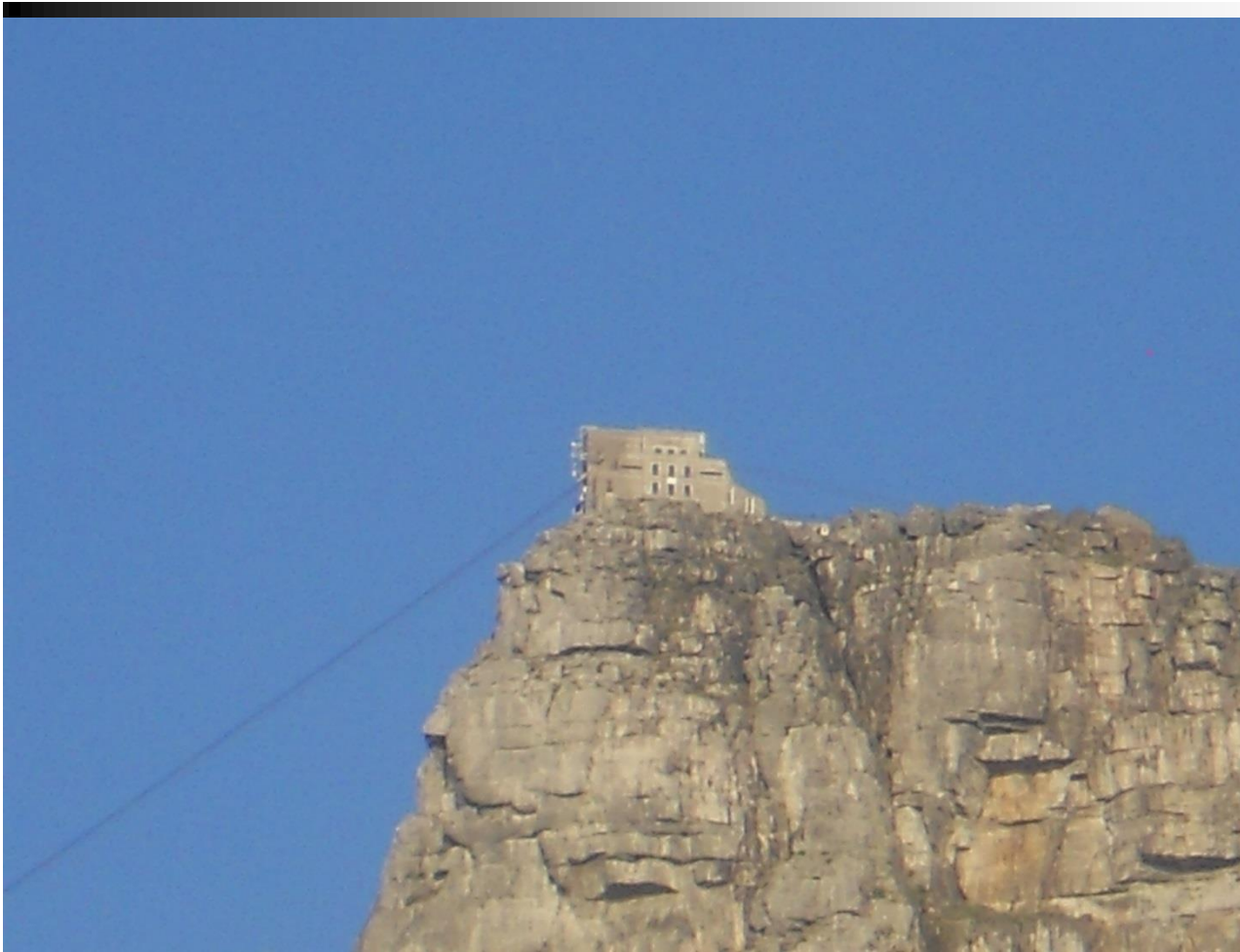
Table 3: Total COA scenarios for contractors with differing CRs for various annual turnovers

Financial implications of H&S performance (5)

Financial Component	Contractor			
	A	B	C	D
CR	50%	75%	100%	24%
Bidding cost (Rs)	952 381	952 381	952 381	952 381
5% Mark-up (Rs)	47 619	47 619	47 619	47 619
Gross bid (Rs)	1 000 000	1 000 000	1 000 000	1 000 000
Initial cost (Rs)	(952 381)	(952 381)	(952 381)	(952 381)
Gross profit before rebate / loading and indirect COA (Rs)	47 619	47 619	47 619	47 619
Rebate / (Loading) (Rs)	581	(930)	(4 360)	2 092
Gross profit after rebate / loading and before indirect COA (Rs)	48 207	46 689	43 259	49 711
Indirect COA (Rs)	(20 342)	(30 513)	(40 684)	(9 765)
Gross profit (Rs)	27 859	16 175	2 576	39 945
Gross profit (%)	2.93	1.70	0.27	4.19
Improvement on / Decrease mark-up (%)	(43.47)	(66.07)	(94.67)	(16.27)

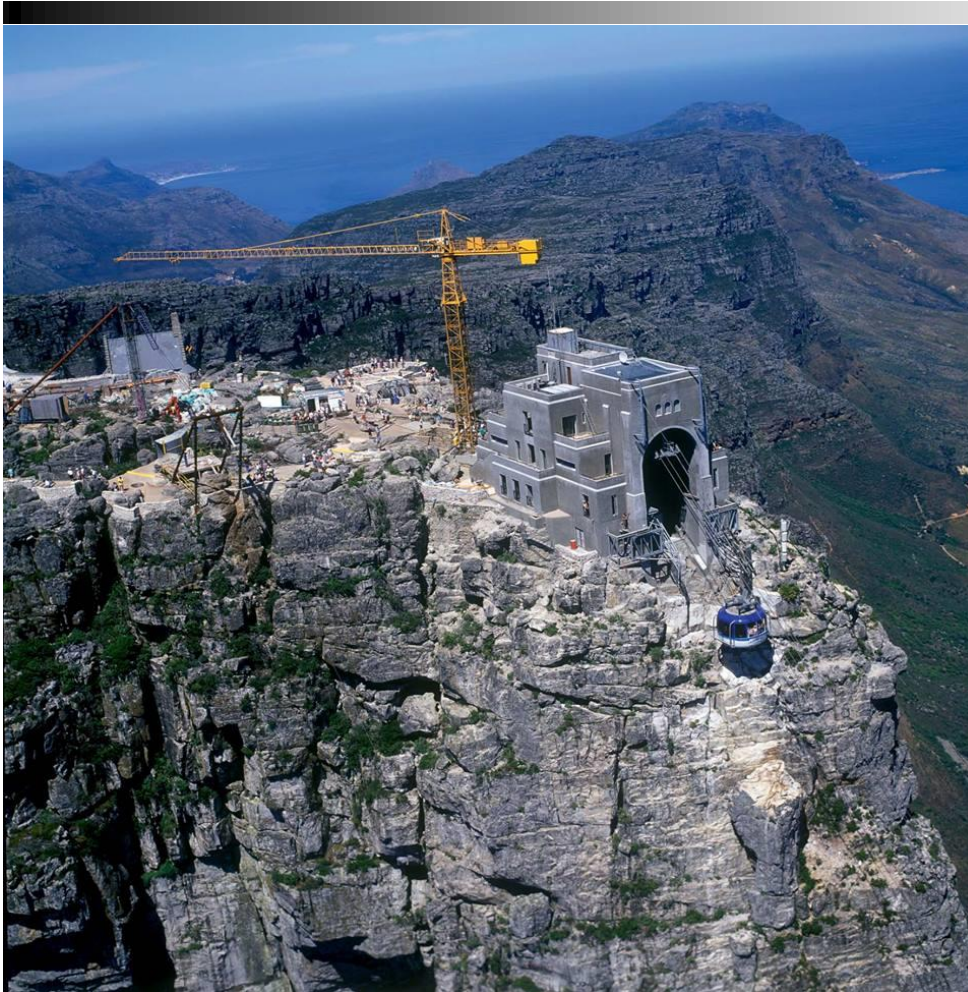
Table 4: Impact of rebates / loadings and indirect COA on gross profit for differing CRs

Clients' needs (1)



Upper Aerial Cableway Station, Table Mountain (Smallwood, 2015)

Clients' needs (2)



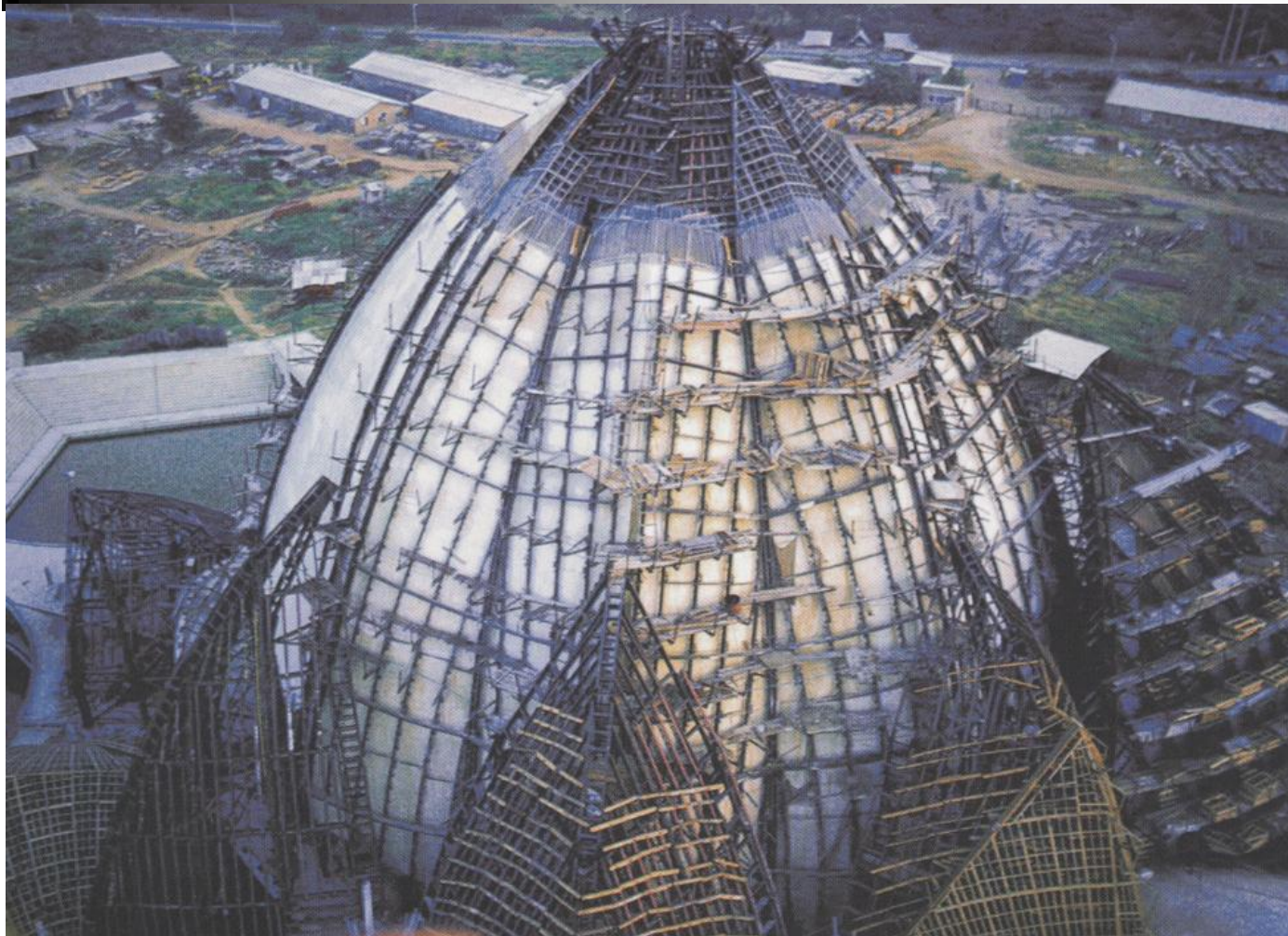
Upper Aerial Cableway Station, Table Mountain (Table Mountain Aerial Cableway, 2014)

General design (1)



Bahia Temple, Delhi, India (Smallwood, 2005)

General design (2)



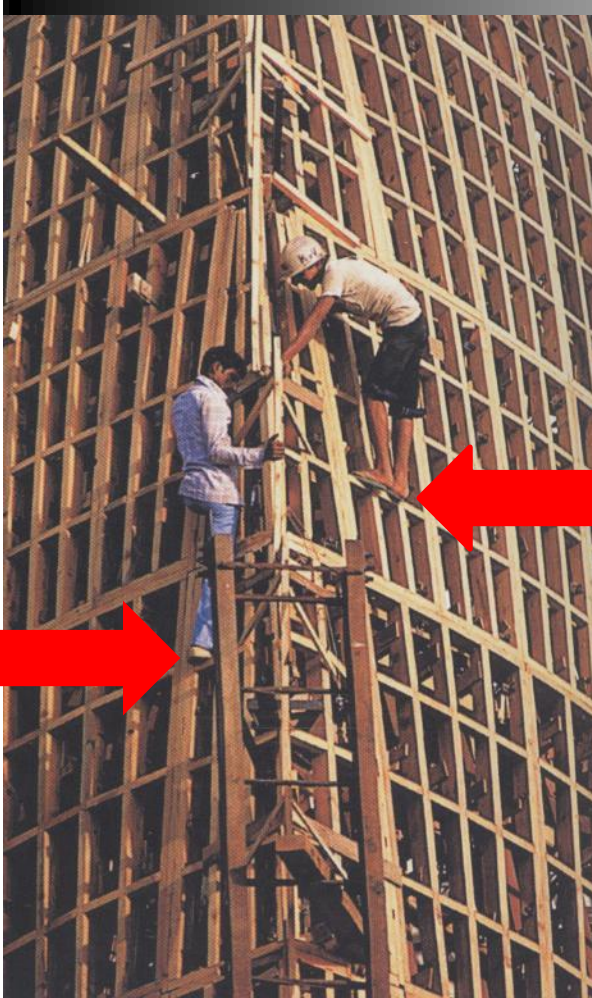
Bahia Temple, Delhi, India (The National Spiritual Assembly of the Bahia'is of India, 2002)

General design (3)



Bahia Temple, Delhi, India (The National Spiritual Assembly of the Bahia'is of India, 2002)

General design (4)



Bahia Temple, Delhi, India (The National Spiritual Assembly of the Bahia'is of India, 2002)

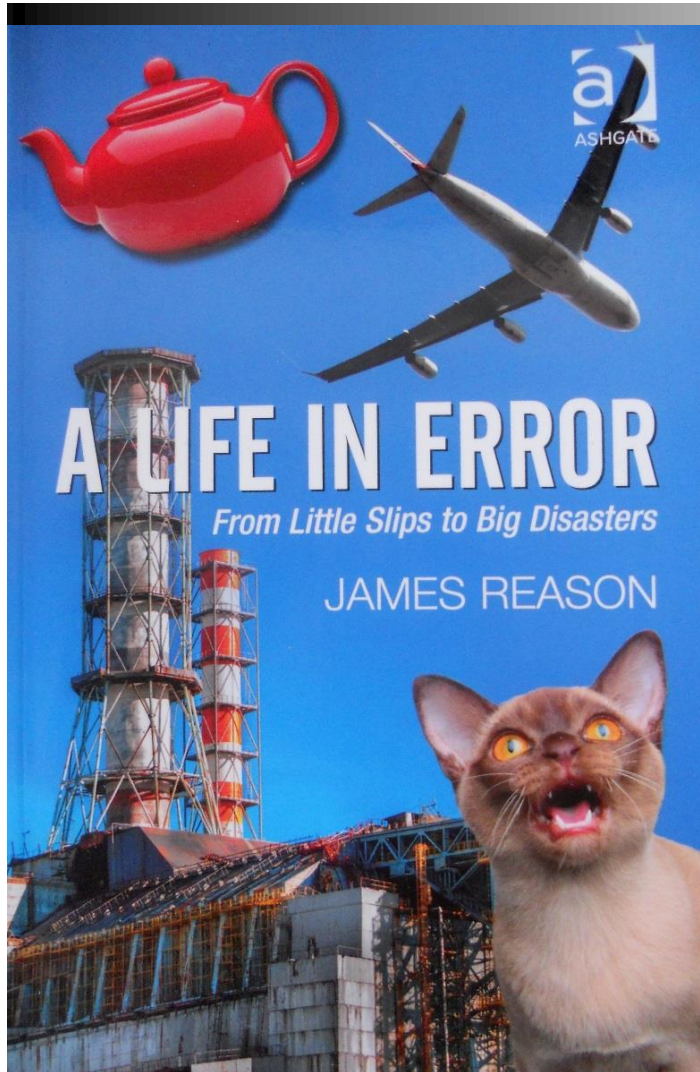
‘Failure of management’ versus ‘Accident’(1)

- **There is no such thing as an ‘accident’ (Myth)!**
- **Traditional definitions include, among other: ‘An unplanned event’**
- **Are ‘accidents’ unplanned?**
 - **Absolutely not!**
 - **Any review will indicate that they are meticulously planned by default i.e. through actions and or omissions**
- **Consequently, given that the five functions of management work are planning, organising, leading, controlling, and coordinating, then unplanned events such as ‘accidents’ = ‘failure of management’ (Reality)**
- **Philosophy and constitutes a state of mind**

‘Failure of management’ versus ‘Accident’(2)

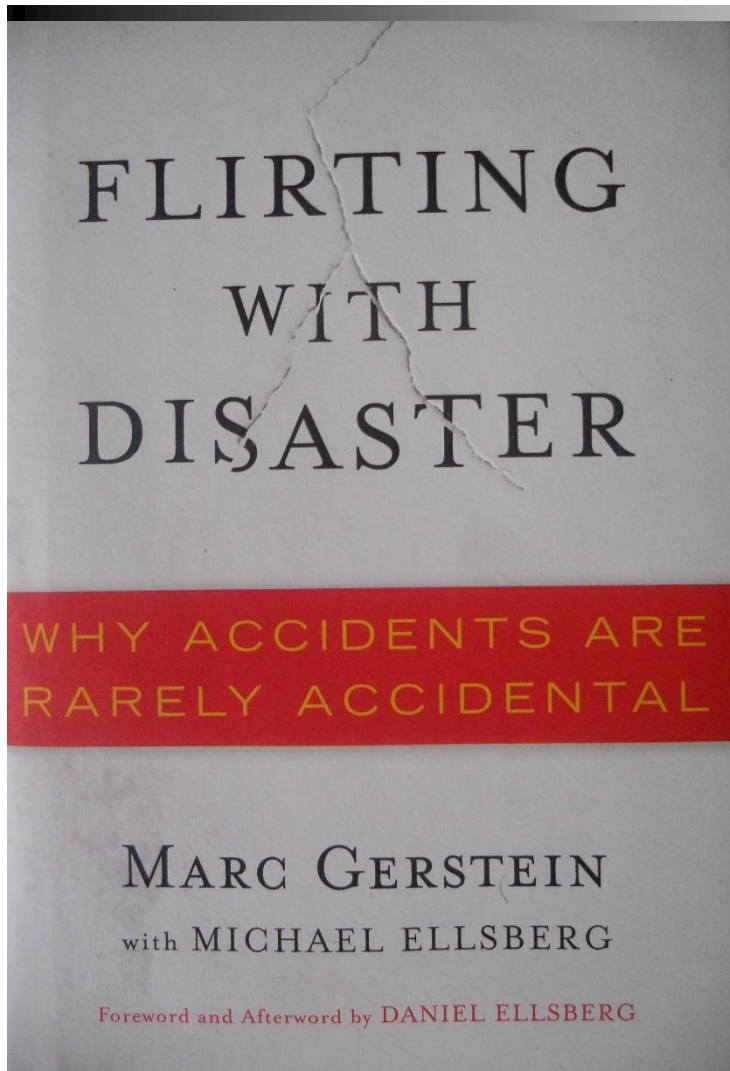
- **Management of all built environment stakeholder organisations, including client, project manager, designer, and quantity surveyor, not just contractors**

'Failure of management' versus 'Accident'(3)



Chapter 8: Planning Failures

'Failure of management' versus 'Accident'(5)



Planning for failure (1)



Stellenbosch Collapse (Anonymous, June 2008)

Planning for failure (2)



Stellenbosch Collapse (Anonymous, June 2008)

Planning for failure (3)



Stellenbosch Collapse (Anonymous, June 2008)

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Construction is a Science, Art, and a Profession / Sound Construction Management (1)



Scaffolding, Bradford on Avon (Smallwood, August 2014)

Construction is a Science, Art, and a Profession / Sound Construction Management (2)



Scaffolding, Bradford on Avon (Smallwood, August 2014)

Construction Regulations (1)

Clients required to, among other (Republic of South Africa, 2014):

- **5 (1) (a) Prepare a baseline risk assessment (BRA)**
- **5 (1) (b) Prepare an H&S specification based on the BRA**
- **5 (1) (c) Provide the designer with the H&S specification**
- **5 (1) (d) Ensure that the designer takes the H&S specification into account during design**
- **5 (1) (e) Ensure that the designer carries out the duties in Regulation 6 ‘Duties of designers’**
- **5 (1) (f) Include the H&S specification (revised after the designers’ reports?) in the tender documents**
- **5 (1) (g) Ensure that potential PCs have made provision for the cost of H&S in their tenders**
- **5 (1) (h) Ensure that the PC to be appointed has the necessary competencies and resources**

Construction Regulations (2)

- 5 (1) (i) Take reasonable steps to ensure cooperation between all contractors appointed by the client
- 5 (1) (j) Ensure that every PC is registered for workers' compensation insurance cover and in good standing
- 5 (1) (k) Appoint every PC in writing
- 5 (1) (l) Discuss and negotiate with the PC the contents of the PC's H&S plan and thereafter approve it
- 5 (1) (m) Ensure that a copy of the PC's H&S plan is available
- 5 (1) (n) Take reasonable steps to ensure that each contractor's H&S plan is implemented and maintained
- 5 (1) (o) Ensure that periodic H&S audits and documentation verification are conducted at agreed intervals, but at least once every 30 days

Construction Regulations (3)

- 5 (1) (p) Ensure that a copy of the H&S audit report is provided by the PC within seven days of the audit
- 5 (1) (q) Stop any contractor from executing an activity which posed a threat to the H&S of persons, which is not in accordance with the H&S specification and H&S plan
- 5 (1) (r) When changes are made to the design or construction work make sufficient H&S information and appropriate resources available to the PC
- 5 (1) (s) Ensure that the H&S file is kept and maintained by the PC
- 5 (2) When additional work is required the client must ensure that sufficient H&S information and appropriate additional resources are available to execute the work safely
- 5 (5) Where a construction work permit is required a client must appoint a competent person in writing as an agent

Construction Regulations (4)

- **5 (6) Where notification of construction work is required the client may appoint a competent person in writing as an agent**
- **5 (7) An agent must :**
 - Manage the H&S on a construction project
 - Be registered with a statutory body
- **3 (1) Application for Construction Work Permit (RSA, 2015):**
 - A client must apply 30 days before the work commences to the Provincial Director in the case of projects commencing on or after:
 - 7 August 2015, if:
 - Contract value more than or equal to R130m or cidb grading level 9
 - 7 February 2017, if:
 - Contract value more than or equal to R40m or cidb grading level 8
 - 7 August 2018, if:
 - Exceeds 360 days and involves more than 3 600 person hours
 - Contract value more than or equal to R13m or cidb grading level 7

Construction Regulations (5)

- **4 (1) Notification of Construction Work (RSA, 2014):**
 - A contractor intending to carry out work other than in 3 (1) must notify the Provincial Director 7 days before commencing the work if it:
 - Includes excavation work
 - Includes work at height where there is a risk of falling
 - Includes demolition work
 - Includes the use of explosives
 - Same procedure applies in the case of a contractor going to build a single story dwelling

Construction Regulations (6)

- **Relative to Structures 6 (1) designers of a structure must:**
- **(a) ensure that the H&S standards incorporated into the regulations are complied with in the design**
- **(b) take the H&S specification into consideration**
- **(c) include in a report to the client before tender stage:**
 - **all relevant H&S information about the design that may affect the pricing of the work**
 - **the geotechnical-science aspects**
 - **the loading that the structure is designed to withstand**
- **(d) inform the client of any known or anticipated dangers or hazards relating to the construction work, and make available all relevant information required for the safe execution of the work upon being designed or when the design is changed – may require ‘design and construction’ method statements**
- **(e) modify the design or make use of substitute materials where the design necessitates the use of dangerous**

Construction Regulations (7)

procedures or materials hazardous to H&S

- **(f) consider hazards relating to subsequent maintenance of the structure and make provision in the design for that work to be performed to minimize the risk**
- **(g) when mandated by the client conduct inspections to ensure conformance of construction to design. If not mandated then the client's agent is responsible**
- **(h) when mandated by the client stop construction work not in accordance with the design's H&S aspects. If not mandated then the client's agent is responsible**
- **(i) when mandated by the client, during his / her final inspection of the structure include the H&S aspects of the structure, declare the structure safe for use and issue a completion certificate**

Construction Regulations (8)

- **To meet these requirements requires clients and designers (including PMs and Qs) to:**
 - **Identify hazards and assess the risk**
 - **Mitigate or eliminate the hazards and risks**
 - **Record the residual risk, if any (Designer Report and H&S Specification)**
 - **Document the BRA and design HIRA processes**
- **All project stages: project initiation and briefing; concept and feasibility; design development; tender documentation and procurement; construction documentation and management, and project close out**
- **Required following any redesign during construction phase**
- **Ergonomic related hazards require analysis, evaluation and to be addressed in the risk assessment**

Baseline Risk Assessments (BRAs)

- Clients initiate projects
- Some clients may have H&S expertise
- Projects may be undertaken on existing facilities
- Clients' processes may be susceptible to inadequate H&S
- Clients through ownership of a facility should be aware of the hazards and challenges related thereto and their processes
- Identify the H&S, and environmental hazards and determine the risk
- Document the process

Helicopter crash (1)



Helicopter crash, Strand Street, Cape Town (Vosloo, 1999)

Helicopter crash (2)



Helicopter crash, Strand Street, Cape Town (Vosloo, 1999)

Helicopter crash (3)



Helicopter crash, Strand Street, Cape Town (Vosloo, 1999)

Helicopter crash (4)



FLAMES OF DEATH . . . The Russian Mi-8 helicopter crashes into the roof of Boston House in Cape Town's central business district early yesterday. A professional photographer, who had been photographing the helicopter as it loaded airconditioning equipment onto the building, ended up capturing these images of a horrific accident in which four people died. Pictures: AP

Helicopter crash, Strand Street, Cape Town (Amalgamated Press, 1999)

Helicopter crash (5)



Helicopter crash, Strand Street, Cape Town (Ingram, 1999)

Helicopter crash (6)



Helicopter crash, Strand Street, Cape Town
 (Blignaut, 1999)

Helicopter crash (7)

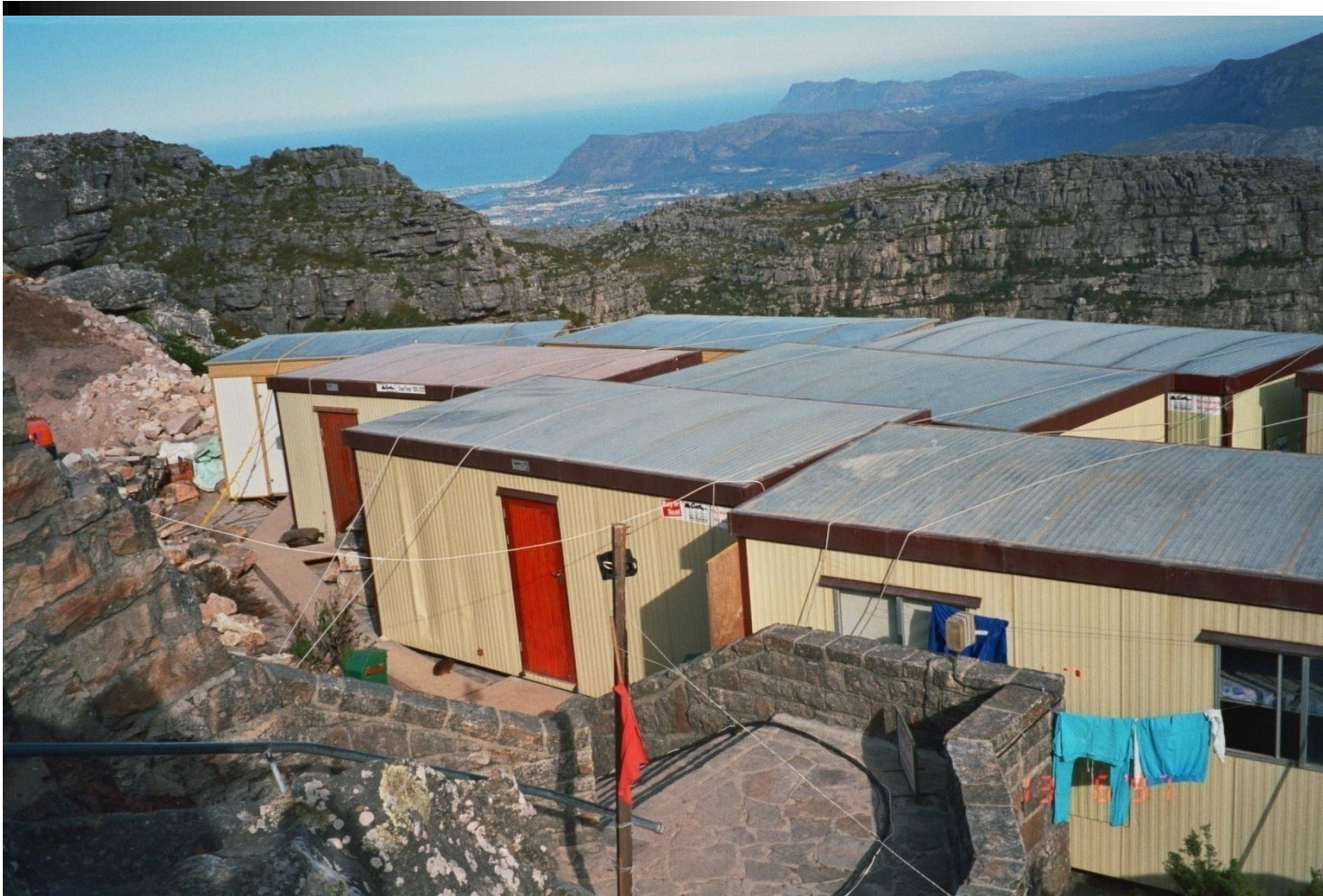
- As with all 'accidents' (failures of management) this was preventable
- A simple 3-D scan of the neighbourhood would have highlighted the hazards and risks
- Amplifies the role of planning in general, and specifically BRAs, 'designer' H&S specifications, 'designer' reports, 'contractor' H&S specifications, and H&S plans
- Construction is not a 'Hollywood movie set'!

Rationale for H&S specifications (1)



Mist, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Rationale for H&S specifications (2)



Site establishment, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Rationale for H&S specifications (3)



Sheer-face construction, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Rationale for H&S specifications (4)



Sheer-face construction, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Rationale for H&S specifications (5)



Sheer-face construction, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Rationale for H&S specifications (6)



Transportation of materials and waste / demarcated protected areas, Aerial Cableway Station, Table Mountain (Deacon, 1997)

Client provided 'Designer' and 'Contractor' H&S Specifications, and Designer 'Report'

- **2014 Regulations require a client provided 'Designer' H&S Specification and a 'Contractor' version (implicitly), linked by a Designer 'Report'**
- **Client provided 'Designer' H&S Specification:**
 - Project details
 - Client's considerations and management requirements
 - Environmental restrictions and existing on-site risks
- **Designer 'Report':**
 - Significant design and construction hazards
- **Client provided 'Contractor' H&S Specification:**
 - H&S file
 - Plus the other four sections included in the Client provided 'Designer' H&S Specification and Designer Report

Client provided 'Designer' H&S Specification - Project details

- **Project location including:**
 - Access e.g. Infrastructure such as railway routes and roads
 - Fauna and related e.g. crocodiles, malaria, and snakes
 - Services e.g. electricity, sewage, and water
 - Socio-economic issues such as crime, and vandalism
 - Weather e.g. precipitation, temperature, and wind
 - Other e.g. landmines
- **Project description**
- **Phases and programme**
- **Details of client, designers, and other consultants**
- **Extent and location of existing records and plans**

Client provided 'Designer' H&S Specification - Client's considerations and management requirements

- **Structure and organisation – general including H&S**
- **H&S goals for the project**
- **H&S monitoring and review**
- **Permit and authorisation requirements**
- **Emergency procedures**
- **Site rules and other restrictions on designers, contractors, suppliers and others e.g. access arrangements to those parts of the site which continue to be used by the client, shift work, night work, restricted hours**
- **Mandatory client provided H&S training**
- **Activities on or adjacent to the site during the works**
- **Arrangements for liaison between parties**

Client provided 'Designer' H&S Specification - Environmental restrictions and existing on-site risks

- **Safety hazards, including:**
 - **Boundaries and access, including temporary access**
 - **Adjacent land uses**
 - **Existing storage of hazardous materials**
 - **Ground conditions e.g. geotechnical report may exist**
 - **Location of existing services – water, electricity, and gas**
 - **Existing structures – degree of stability, or fragile materials**
- **Health hazards, including:**
 - **Asbestos, including results of surveys**
 - **Existing storage of hazardous materials**
 - **Contaminated land, including results of previous or current surveys**
 - **Existing structures - hazardous materials e.g. asbestos containing**
 - **Health risks arising from client's activities e.g. sewage works**

Designer 'Report' - Significant design and construction hazards

- **Ground conditions e.g. geotechnical report**
- **Design assumptions and control measures e.g. design and construction method statements – composite slabs, and structural steel i.e. temporary support / bracing**
- **Arrangements for co-ordination of on-going design work and handling design changes e.g. Nominated subcontractors' shop drawings**
- **Information on significant hazards identified during design e.g. bush-hammered concrete**
- **Materials requiring particular precautions e.g. heavy blocks, and precast concrete kerbs**

‘Contractor’ H&S Specification - H&S file

- **‘As built’ drawings and plans**
- **Design criteria e.g. design loadings**
- **Potential hazards included in the structure**
- **Construction methods and materials used**
- **Record of hazardous processes e.g. removal of asbestos containing materials (ACMs)**
- **Equipment and maintenance facilities**
- **Maintenance procedures and requirements**
- **Manuals (operating and maintenance) for plant and equipment**
- **Location and nature of utilities and services**

Reduction of risk through design and specification (1)

- Optimum approach – prevent hazard arising and avoid risk – are there alternatives?
- If not reasonably practicable - then combat at source
- If not reasonably practicable - then priority for measures to control risk that provide communal protection
- Specification of PPE to control risk is a last resort (contractor)

Reduction of risk through design and specification (2)



(Steel Construction, 2004)

Reduction of risk through design and specification (3)



(Steel Construction, 2004)

Reduction of risk through design and specification (4)



(Steel Construction, 2004)

Design HIRA (1)



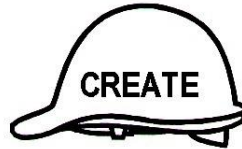
Precast planks / ribs and blocks to composite slab, Plettenberg Bay (Hamp-Adams, 1994)

Design HIRA (2)



Precast planks / ribs and blocks to composite slab, Plettenberg Bay (Hamp-Adams, 1994)

Design HIRA (3)



An example of a generic risk assessment form (GRA) -Page 1				
NAME OF ORGANISATION				
NAME OF PROJECT				
ACTIVITY COVERED		Erecting precast plank and hollow block composite slab		
SIGNIFICANT HAZARDS		ASSESSMENT OF RISK		
		LOW	MEDIUM	HIGH
1	People falling			3 X 3 = 9
2	Materials falling			3 X 2 = 6
3	Collapse of structure	1 X 3 = 3		
4	Pinching	3 X 1 = 3		
5	Manual handling			3 x 2 = 6
6	Tripping			3 x 2 = 6
7	Failure of blocks (material)			2 X 3 = 6

Figure 2: Design HIRA for erecting precast plank and hollow block composite slab using a 3 X 3 (Likelihood X Impact) template

Design HIRA (4)



Positioning pre-stressed precast hollow core slab using crane and a lifting beam (SA Builder Bouer, 2004a)

© 2005 : Prof JJ Smallwood

Design HIRA (5)



Positioning pre-stressed precast hollow core slab using crane and a lifting beam (SA Builder Bouer, 2004b)

Documentation of process

- Name(s) and function(s) of the assessor(s) / team
- Date of HIRA
- Work breakdown structure (WBS) / Elements / Finishes / Activities
- Hazards and risk / the above
- Response
- Client 'Designer' H&S specification and / or Designer report reference
- Details of subsequent monitoring arrangements e.g. Client 'Contractor' H&S Specification, H&S Plan, construction and requirements for further risk assessments

Indirect role of clients (1)

- **Clients influence construction H&S directly**
- **However, construction H&S is influenced indirectly through: selection of procurement system; preparation of contract documentation; decision regarding project duration; pre-qualification of contractors in terms of H&S, and the status of design upon commencement of construction**
- **Selection of procurement system:**
 - **Design-Build is the ideal as it integrates design and construction**
- **Preparation of contract documentation:**
 - **Detailed reference to H&S**
 - **Facilitate optimum financial provision for H&S**
- **Decision regarding project duration:**
 - **Scope, value, and complexity of project compatible with H&S**

Indirect role of clients (2)

- **Pre-qualification of contractors in terms of H&S:**
 - Outcome measures e.g. DIIR and fatality rate
 - Performance measures e.g. H&S qualifications and or education / training of management, supervisors, and workers
- **Status of design upon commencement of construction:**
 - Ideally complete – variation orders and additional work can ‘complicate’ H&S

Ergonomics Case Study (1)



University of Port Elizabeth Main Building (Smallwood, 2001)

Ergonomics Case Study (2)

UPE Main Building 'spalling' concrete repairs:

- **Issues:**
 - Work at elevated heights
 - High wind speeds
 - Need to access every cm²
 - Administration building – need to mitigate disruption to work
- **Solution:**
 - Double-decker perimeter scaffold
 - Design included in contract documents
 - Item included in BoQs
- **Cost:**
 - R 1.049m (20.3% of project value)

Ergonomics Case Study (3)

- **Benefits:**
 - No fatalities or disabling injuries
 - Project completed on schedule
 - Optimum access:
 - Work
 - Inspections

Research (1)

- **Research was conducted subsequent to the promulgation of the Construction Regulations, the objectives relative to clients being to determine, among other (Smallwood, 2008):**
 - **Clients' perceptions and practices relative to construction H&S**
 - **Benefits of clients' contributions to construction H&S**
- **Sample stratum: 75 members of the South African Property Owners Association (SAPOA)**
- **13 Responses were included in the analysis of the data, which constitutes a net response rate of 18.3% [13 / (75 – 4 RTS)]**
- **Mean scores (MSs) based upon percentage responses to a range of:**
 - **Not to Very important**
 - **Never to Always**
 - **Not, and a Minor extent to a Major extent**

Research (2)

Parameter	Response (%)						MS	Rank
	Un- sure	Not Very						
		1	2	3	4	5		
Project time	0.0	0.0	0.0	0.0	15.4	84.6	4.85	1
Project quality	0.0	0.0	0.0	7.7	7.7	84.6	4.77	2
Project cost	0.0	0.0	0.0	0.0	30.8	69.2	4.69	3
Public H&S	0.0	0.0	7.7	7.7	7.7	76.9	4.54	4
Project H&S	0.0	0.0	7.7	0.0	30.8	61.5	4.46	5
Environment	0.0	0.0	0.0	23.1	30.8	46.2	4.23	6
Construction ergonomics	0.0	7.7	0.0	7.7	76.9	7.7	3.77	7

Table 5: Importance of project parameters to respondents' organizations (MS = 1.00 – 5.00) (Smallwood, 2008).

Research (3)

Intervention / Requirement	Response (%)						MS	Rank
	Unsure	Never	Rarely	Some-times	Often	Always		
Require a project H&S plan of contractors	0.0	0.0	0.0	7.7	0.0	92.3	4.85	1
Require inclusion of an H&S section in the Bill of Quantities / Contract documentation	0.0	0.0	7.7	0.0	7.7	84.6	4.69	2=
Require a contractor H&S management system	0.0	0.0	0.0	7.7	23.1	69.2	4.62	3
Provide a project H&S specification to contractors	0.0	0.0	7.7	7.7	23.1	61.5	4.38	4
Specify materials i.e. instruct designers	0.0	0.0	0.0	15.4	46.2	38.5	4.23	5=
Conduct constructability reviews of design	0.0	0.0	7.7	7.7	38.5	46.2	4.23	5=
Ensure contractor's registration for compensation insurance	0.0	7.7	7.7	7.7	7.7	69.2	4.23	5=
Provide contractor H&S guidelines	0.0	0.0	23.1	0.0	23.1	53.8	4.08	8
Contractor H&S Coordinator	0.0	7.7	7.7	7.7	30.8	46.2	4.00	9=
Require risk assessments	0.0	15.4	0.0	7.7	23.1	53.8	4.00	9=
Review designer 'design and construction' method statements	0.0	0.0	7.7	23.1	46.2	23.1	3.85	11=

Table 6A: Extent to which clients provide / contribute to / require relative to contractors
(MS = 1.00 – 5.00) (Smallwood, 2008).

Research (4)

Intervention / Requirement	Response (%)						MS	Rank
	Unsure	Never	Rarely	Some-times	Often	Always		
Provide client H&S induction	0.0	7.7	23.1	0.0	15.4	53.8	3.85	11=
Require method statements	0.0	0.0	15.4	30.8	23.1	30.8	3.69	13=
Require safe work procedures (SWPs)	7.7	7.7	7.7	7.7	23.1	46.2	3.69	13=
Attendance of client H&S meetings	0.0	15.4	15.4	7.7	23.1	38.5	3.54	15
Ensure adequate contractor financial allowance for H&S	7.7	15.4	7.7	7.7	23.1	38.5	3.38	16
Review contractor H&S meeting minutes	0.0	15.4	15.4	30.8	7.7	30.8	3.23	17
Require permit to work	7.7	15.4	15.4	15.4	7.7	38.5	3.15	18
Require employee identification	0.0	23.1	15.4	23.1	7.7	30.8	3.08	19
Pre-qualify contractors on H&S	0.0	30.8	23.1	0.0	15.4	30.8	2.92	20
Provide H&S training to contractors	0.0	30.8	30.8	7.7	0.0	30.8	2.69	21
Require material safety data sheets (MSDSs)	7.7	38.5	7.7	15.4	23.1	7.7	2.31	22
Provide H&S incentives	7.7	53.8	30.8	0.0	7.7	0.0	1.46	23

Table 6B: Extent to which clients provide / contribute to / require relative to contractors (MS = 1.00 – 5.00) (Smallwood, 2008).

Research (5)

Improvement	Response (%)							MS	Rank
	Un- sure	Did not	Minor Major						
			1	2	3	4	5		
Fewer contractor accidents	23.1	0.0	7.7	0.0	23.1	23.1	23.1	3.70	1=
Less impact on the environment	23.1	0.0	15.4	0.0	0.0	38.5	23.1	3.70	1=
Less complications	7.7	7.7	7.7	7.7	30.8	23.1	15.4	3.08	3=
Increased client satisfaction	7.7	7.7	15.4	7.7	7.7	38.5	15.4	3.08	3=
Improved contractor productivity	7.7	0.0	15.4	23.1	23.1	15.4	15.4	2.92	5=
Improved client performance (overall)	7.7	7.7	15.4	7.7	23.1	23.1	15.4	2.92	5=
Improved contractor quality / Less rework	7.7	7.7	15.4	15.4	30.8	7.7	15.4	2.67	7=
Less disruption of client process	7.7	7.7	15.4	15.4	30.8	7.7	15.4	2.67	7=
Improved contractor time (schedule) performance	15.4	7.7	7.7	30.8	23.1	0.0	15.4	2.55	9

Table 7: Extent to which benefits have been realised as a result of clients' contributions to contractor H&S (MS = 0.00 – 5.00) (Smallwood, 2008).

Research (6)

Impact / Potential impact	Response (%)						MS
	Un- sure	Minor Major					
		1	2	3	4	5	
Have influenced	0.0	8.3	8.3	33.3	33.3	16.7	3.42
Could influence	0.0	0.0	0.0	30.8	38.5	30.8	4.00

Table 8: Extent to which clients have influenced construction H&S, and the extent to which they could influence construction H&S (MS = 1.00 – 5.00) (Smallwood, 2008).

Key points

- **Clients initiate projects**
- **Cost, quality and time are more important parameters to clients than H&S**
- **Clients can and do influence H&S through design, procurement, and construction:**
 - **Influence can be positive or negative**
- **South African clients can be deemed to exert a degree of influence on contractor H&S**
- **Fewer accidents predominates among manifestations of improvement resulting from such influence**

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