

# **7TH INTERNATIONAL CONFERENCE ON ENGINEERING, PROJECT, AND PRODUCTION MANAGEMENT (EPPM)**

---

**BIALYSTOK, POLAND  
21-23 SEPTEMBER 2016**

**INFLUENCING WORKERS' PERFORMANCE THROUGH  
HEALTH AND SAFETY INTERVENTIONS**

**JOHN SMALLWOOD AND WINN-YAM AYEESAKI  
NELSON MANDELA METROPOLITAN UNIVERSITY  
SOUTH AFRICA**

# Introduction (1)

---

- **The construction industry is one of the most labour intensive industries and the largest employer in most countries worldwide**
- **Productivity trends in the industry have a notable effect on national productivity and on the economy as a whole**
- **Workers:**
  - **Constitute a large part of the construction cost and the quantity of workers' hours in performing a task in construction is more susceptible to the influence of management than materials or capital are**
  - **The improvement of workers' performance should be a major and continual concern to achieve projects' objectives**
  - **Worker performance is thus an important factor contributing to the timely completion and success of a construction project**

## Introduction (2)

---

- **The research seeks to:**
  - **Enhance the Project Management Body of Knowledge (PMBOK) in the area of performance improvement, with H&S as the medium**
  - **Be reminiscent of CPMs' influence on project parameters such as productivity and H&S, and how it may contribute to enhanced overall project performance**

# Review of the literature

---

- **H&S culture and perception**
- **Profitability, performance, and productivity**
- **The construction work environment**
- **Construction project management and H&S:**
  - **Design**
  - **Hazard Identification and Risk Assessments (HIRAs)**
  - **Financial provision for H&S**
  - **Communication**
  - **Partnering**
  - **Risk management**

# Research – Sample stratum and method

- **Research method:**
  - A self-administered questionnaire consisting of primarily closed end five point Likert scale type questions
  - Interviews
- **Statistics:**
  - Frequencies (percentages)
  - Mean scores (MSs), a measure of central tendency, are between 1.00 (lower end) and 5.00 (upper end), 3.00 being the midpoint
- **Response rate:**

Group	Questionnaires (Qs) and Interviews (Is)					Response (%)
	Requested / Sent	Not delivered	Not applicable	Net sample	Under-taken / Returned	
ECMBA (Q)	60	2	0	58	12	20.7
SACPCMP (Q)	1 308	753	0	555	24	4.3
SACPCMP, EC (I)	5	0	0	5	5	100.0

Table 1. Response rate.

## Research – Demographics of respondents

---

- **43.4 years of age on average**
- **18.8% were female and 81.2% were male**
- **Worked on average 10.5 years for their current employer, and 16.5 years in construction**
- **Qualifications ranged from certificates to diplomas to honours degrees**
- **Disciplines ranged from architecture to construction management to environmental health**
- **Occupations ranged from managing directors, site managers, to H&S Officers**

# Research – Findings (1)

Group	Response (%)						MS
	Unsure	Strongly disagree.....Strongly agree					
		1	2	3	4	5	
ECMBA	0.0	8.3	0.0	16.7	33.3	41.7	4.00
SACPCMP	0.0	0.0	0.0	0.0	45.8	54.2	4.54
Mean	0.0	2.8	0.0	5.6	41.6	50.0	4.36

Table 2. Extent to which workers' motivation affects their performance (MS = 1.00 – 5.00).

Group	Response (%)						MS
	Unsure	Strongly disagree.....Strongly agree					
		1	2	3	4	5	
ECMBA	16.7	16.7	16.7	50.0	0.0	0.0	2.40
SACPCMP	13.0	4.3	17.4	34.8	21.7	8.7	3.15
Mean	14.2	8.4	17.2	39.9	14.5	5.8	2.90

Table 3. Extent of relationship between poor constructability and WMSDs (MS = 1.00 – 5.00).

## Research – Findings (2)

Group	Response (%)					MS	
	Unsure	Strongly disagree.....Strongly agree					
		1	2	3	4		5
ECMBA	16.7	16.7	16.7	33.3	8.3	8.3	2.70
SACPCMP	16.7	0.0	8.3	8.3	54.2	12.5	3.85
Mean	16.7	5.6	11.1	16.6	38.9	11.1	3.47

Table 4. Extent of relationship between poor training and WMSDs (MS = 1.00 – 5.00).

Group	Response (%)					MS	Rank	
	Unsure	Very dissatisfied.....Very satisfied						
		1	2	3	4			5
Personal protective equipment	0.0	4.2	0.0	8.3	62.5	25.0	4.04	1
Medical / First aid facilities	0.0	0.0	8.3	8.3	58.3	25.0	4.00	2
Site conditions	0.0	0.0	4.2	12.5	70.8	12.5	3.92	3
Site planning	0.0	0.0	12.5	8.3	58.3	20.8	3.88	4
Hoarding	0.0	0.0	16.7	12.5	50.0	20.8	3.75	5
Scaffolding	4.2	0.0	12.5	12.5	41.7	29.2	3.75	6
Communication among stakeholders	0.0	0.0	16.7	20.8	33.3	29.2	3.75	7
QMSs	0.0	0.0	20.8	16.7	33.3	29.2	3.71	8
Welfare facilities	0.0	0.0	25.0	29.2	33.3	12.5	3.33	9

Table 5. Degree of CPMs' satisfaction with various project aspects (SACPCMP) (MS = 1.00 – 5.00).



## Research – Findings (3)

Form	Response (%)						
	Unsure	0%	> 0% ≤ 1%	> 1% ≤ 2%	> 2% ≤ 3%	> 3% ≤ 4%	> 4%
Provisional sum	45.5	9.1	13.6	0.0	0.0	0.0	31.8
Detailed H&S preliminaries	30.4	0.0	17.4	13.0	4.3	0.0	34.8
Preliminaries items	59.1	4.5	4.5	4.5	4.5	0.0	22.7

**Table 6. Percentage of contract sums allocated towards H&S.**

Criterion	Response (%)						MS	Rank
	Unsure	Not important.....Very important						
		1	2	3	4	5		
Technical capacity	0.0	0.0	0.0	0.0	20.8	79.2	4.79	1
Experience	0.0	0.0	0.0	0.0	29.2	70.8	4.71	2
Management ability	0.0	0.0	4.2	4.2	29.2	62.5	4.50	3
Financial stability	0.0	0.0	0.0	4.2	41.7	54.2	4.50	4
Health and Safety	0.0	0.0	0.0	16.7	37.5	45.8	4.29	5
Reputation	0.0	0.0	12.5	8.3	45.8	33.3	4.00	6
Past relationships	0.0	0.0	20.8	25.0	29.2	25.0	3.58	7

**Table 7. Importance of contractor pre-qualification criteria (SACPCMP) (MS = 1.00 – 5.00).**

## Research – Findings (4)

Factor	Response (%)						MS	Rank
	U	Minor.....Major						
		1	2	3	4	5		
Poor site conditions	0.0	0.0	8.3	16.7	25.0	50.0	4.17	1
Poor site planning	0.0	8.3	0.0	16.7	50.0	25.0	3.83	2
Accidents	0.0	8.3	8.3	16.7	33.3	33.3	3.75	3
Poor maintenance of welfare facilities	0.0	0.0	16.7	25.0	33.3	25.0	3.67	4
Inadequate H&S measures	0.0	8.3	0.0	33.3	33.3	25.0	3.67	5
Poor provision of welfare facilities	0.0	0.0	25.0	25.0	16.7	33.3	3.58	6
Poor constructability	0.0	8.3	16.7	16.7	41.7	16.7	3.42	7
Illness / Ill health	8.3	0.0	16.7	16.7	41.7	16.7	3.33	8
Inadequate risk assessments	0.0	8.3	0.0	58.3	33.3	0.0	3.17	9
Inadequate design	8.3	0.0	25.0	25.0	33.3	8.3	3.00	10
Poor integration of design and construction	8.3	8.3	8.3	33.3	41.7	0.0	2.92	11
Exposure to HCSs	8.3	0.0	33.3	16.7	41.7	0.0	2.83	12
Inadequate medical examinations	8.3	8.3	16.7	41.7	25.0	0.0	2.67	13
Lack of contractor pre-qualification in terms of H&S	16.7	8.3	0.0	50.0	16.7	8.3	2.67	14
Inadequate financial provision for H&S	8.3	16.7	16.7	33.3	8.3	16.7	2.67	15
WMSDs	25.0	8.3	8.3	25.0	33.3	0.0	2.33	16

**Table 8: Extent to which factors affect workers' performance (ECMBA) (MS = 1.00 – 5.00).**

## Research – Findings (5)

Group	Response (%)		
	Unsure	Yes	No
ECMBA	8.3	41.7	50.0
SACPCMP	0.0	62.5	37.5
Mean	2.8	55.6	41.7

Table 9: Involvement in partnering.

## Conclusions (1)

---

- **The focus of the study – to determine whether CPM H&S interventions can and do improve workers’ performance (CPMs do not manage the physical construction process):**
  - **The literature indicates that they can influence worker performance indirectly through H&S interventions, and for that matter other interventions**
- **The finding that workers’ motivation affects their performance, indicates that H&S, which influences motivation, should be optimum, which confirms that CPMs can influence workers’ performance through H&S interventions**
- **The finding that there is a relationship between poor constructability and WMSDs, and poor training and WMSDs, and that WMSDs have a direct influence on workers’ performance, further confirms the potential indirect**

## Conclusions (2)

---

### **influence of CPMs:**

- **CPMs should review constructability, and they should indirectly monitor H&S training, which should also be addressed in H&S plans**
- **The degree of CPMs' satisfaction with various project aspects indicates that they monitor such aspects, which if optimum, have a positive impact on workers' performance**
- **The extent of 'unsure' response relative to the percentage of contract sums allocated towards H&S is notable - CPMs not reminding their clients of their statutory duty, but also not interrogating this aspect**
- **The extent to which factors affect workers' performance according to ECMBA respondents further confirms the potential indirect influence of CPMs on workers' performance**

## Conclusions (3)

---

- **Although 79.2% of SACPCMP respondents indicated they review H&S plans they should all do so as it is a further indirect medium of CPM influence of workers' performance**
- **Involvement in partnering is not pervasive, which indicates that a potential indirect medium of CPM influence of workers' performance has not been exhausted**
- **Overall, CPMs' do influence workers' performance through H&S and related interventions, however, there is potential to enhance such influence**

## Recommendations (1)

---

- **CPMs need to make better use of their influence to convince clients with respect to: adequate financial provision for H&S; pre-qualifying contractors in terms of H&S, ensuring H&S is duly implemented during projects, and promoting partnering;**
- **CPMs need to improve communication channels between project stakeholders. Often what happens at worker level does not align with management's perceptions and vice-versa, and project stakeholders have a different understanding of matters at hand**
- **Legislators need to raise client awareness regarding H&S and worker welfare, and need to provide more incentives for H&S compliance in order to assist CPMs with improving project H&S performance and therefore workers' performance**

## Recommendations (2)

---

- **Training needs to empower workers and industry professionals with H&S knowledge. Legislation without willingness and ability is insufficient to drive the stakeholders to take adequate action toward improving H&S measures in projects**
- **The quality of CPM H&S interventions towards improving workers' performance needs to be further interrogated**