

1 **Safety Management Amongst Small Contractors in**
2 **Selangor, Malaysia**

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8 **Abstract.** Safety management system (SMS) incorporates direction on the
9 safety, guideline and documentation, safety preparing, crisis readiness and also
10 reaction arrangement and safety approach. It is an important element to be
11 implemented in the construction industry. Therefore, it is important for the small
12 contractors to develop, implement and maintaining the safety management
13 system in their project. This paper aims to identify the safety management system
14 amongst small contractors in Malaysia. Questionnaires survey was sent out to
15 100 small contractors of Grade G1 registered under the Malaysian Construction
16 Industry Board (CIDB) with a thirty-five (35%) returned. As a results, it was
17 found that the problems occur in construction sites were improper controls
18 machine, inadequate maintenance, unsafe of employee attitudes, unsafe
19 conditions of materials, plants and equipment, ineffective of training of
20 instruction, use of alcohols and drugs, lack of communication, improper
21 motivation of operational personnel as well as improper safety rules and
22 guideline. It is recommended that the small contractors should implement the
23 safety management techniques or procedures during the construction to avoid and
24 control the risk and need to develop and conduct the safety training programmes
25 and training policy for the workers on the site. They must provide an adequate
26 Personal Protection Equipment (PPE) for workers on site for protection and
27 prevent from risks and accidents which may occur during construction operation.

28 **Keywords:** Safety Management, Small Contractors

29 **1 Introduction**

30 Safety and health is a logic that recognizes and wipes out employment site dangers all
31 through the lifecycle of any work venture. It is a logic that disheartens work hones that
32 spot people in danger of harm and the joining of safety and health into the daily work
33 process. According to Choudhry [1], safety have become the most importance issues
34 during the construction process. It is likewise the advancement of a situation where
35 every individual in the task development progressive has a part and obligation regarding
36 safety and health. At the point when construction undertaking of built the building, the
37 industry of construction essential to guarantee the construction sites being protected.

38 Safety management amongst the small contractors needs to know the significance of
39 safety during construction which keeps up safety at sites. According to Fabiano et al.
40 [2], opposite relationship between the company size and level of occupational accidents
41 is exist. It can so be argued that small workplaces are more probable to have accidents
42 than larger ones. The contractor ought to recognize the safety risks and prevention
43 rehearses which every each will convey directly to construction site. Through safety
44 administration, the employer can guarantee the safety coordination, safety orientation,
45 and practices of safety organizations.

46 The safety management system will guarantee the work performed to determine
47 prerequisites is set up, reported, actualized and kept up. Safety management system, the
48 parts of hierarchical, as far as its capacities, Personnel Protective Equipment (PPE),
49 safety management instruments, cooperation with different divisions, safety
50 management project and safety management hones. Previous findings revealed that the
51 successful development and application of SMS would help in preventing the accidents
52 from happening in the construction industry [3; 4; 5; 6]. According to Fewings [7],
53 good Health and Safety performance in the construction industries of developed
54 countries are largely attributed by systematic implementation of Health and Safety
55 management practices as stipulated in Health and Safety management systems. Hence,
56 there is a need for a comprehensive understanding on the safety measures by all
57 contractors and project administrators.

58 **2 Literature Review**

59 The safety management system (SMS) should be actualized to lead security approach
60 and enhance the safety execution at every level of authoritative and person and
61 incorporates direction on the safety, guideline and documentation, safety preparing,
62 crisis readiness as well as reaction arrangement and safety approach. The safety
63 management approaches can be undertaken by critically observing the company's
64 safety policies, safety procedures and practices, particularly during its implementation
65 on construction site [4] in addition to executing a safety management program into each
66 of construction activities.

67 Projects are complex in nature, as they involve technical, procedural, organizational
68 and human elements in an integrated manner [8]. Hence, after reviewing the safety
69 levels, assessment an arrangement are ought to be created with a specific end goal to
70 actualize the quality system. Besides that, the way towards safety management system
71 is by distinguishing and building up the controls, forms, hardware, abilities and assets,
72 besides it has to guarantee that all outlines, strategies and documentation are
73 appropriate, upgrading control, testing and examination procedures, recognizing any
74 estimation prerequisites, clearing up acknowledgment benchmarks as well as
75 distinguishing quality records to name a few. Several control components in a quality
76 system arrangement also need to be incorporated to the system including formal
77 reporting, records of activities, review of the reports, problem discoveries and so forth.
78 Moreover, in leading the strategy for executing safety in the construction process, the
79 contractor must be a part of the safety management system. Thus, failure to implement

80 SMS on site will lead to the numerous dangers and risks. Therefore, employers and
 81 workers had to formulate and implement health and safety policies and procedures to
 82 manage health and safety risks [9; 10; 11].

83 Furthermore, the factors of issues in the safety management system with a specific
 84 end goal to evade and control the dangers are the contractor does not build up the safety
 85 inspection, absence of data in regards to the danger control program which the
 86 contractor did not assess the hazard and risk frequently. According to Goh and Chua
 87 [12], construction safety risk assessment helps to improve the efficiency and quality of
 88 new hazard identification. It is the contractor's obligation carry out the risk assessment
 89 in accomplishing an effective health and safety on site. Besides that, safety instructions
 90 and safety training should be provided at extraordinary levels as when degree of safety
 91 information stands low. It is conceivable that danger might be happen during the project
 92 execution. Meanwhile, health and safety management issues in small businesses are
 93 related to lack of adequate resources to address health and safety issues, as well as lack
 94 of knowledge of the firm's health and safety risks [13]. Therefore it is important to note
 95 that, the lack of risk-related knowledge and resources contributes to accidents on site
 96 and the aim of this paper is to recommend the best practice of safety management
 97 system amongst small contractors in Selangor, Malaysia. The next section describes
 98 methodology an analysis used in the study.

99 **3 Methodology and Analysis**

100 Questionnaires were distributed to 100 respondents with the feedback of 35% replied.
 101 In terms of respondent profiles, out of 35 respondents, 15 respondents (43%) is from
 102 Grade G1 and 20 respondents (57%) are contractors registered under MCIDB. Most
 103 respondents have working experiencing between 5 to 10 years and all respondents
 104 understood and implementing the safety management system on the site. Majority
 105 implemented safety procedures, risk control, review safety procedure and prepared
 106 health and safety policy and safety plan. They also conducted the safety inspection and
 107 safety audit of work undertakings. Majority of the respondents did conducting safety
 108 inspection and safety audit. Majority contractors conducted the safety audit on daily
 109 basis and (34%) from its not conducting the safety audit and provide It shows that (97%)
 110 of the small contractors are providing the Personal Protection Equipment (PPE) to the
 111 labourers on site while carrying out the works. However, its shows that (80%) of
 112 respondents does not conduct the training programs for labourers on site.

113 It shows that (91%) of the respondents implement health and safety for labourers in
 114 construction sites and majority carry out the risk assessment on the work site and did
 115 not have the system to manage the hazardous substances. They did not do the reporting,
 116 recording and investigation of incidents, injuries and illness. Majority are not having
 117 the safety committee. It shows that (74%) of the majority are having the safety meeting
 118 on site.

119 **Table 1.** The main factors of accidents occurred on construction site.

No.	Factors	Mean	Rank
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A1	Unsafe of employees attitude	4.40	1
A2	Unsafe conditions of materials, plants and equipments	3.94	7
A3	Ineffective of training instruction	3.80	9
A4	Use of alcohol and drugs	4.34	2
A5	Inadequate maintenance	4.09	6
A6	Lack of communication	4.20	4
A7	Improper motivation of operational personnel	3.91	8
A8	Improper safety rules or guidelines	4.14	5
A9	Improper machine controls	4.23	3

120 Table 1 shows that the main factors occurrences of accidents on the construction site.
 121 Majority of the respondents agreed to the facts that the factor of factors the accidents is
 122 unsafe of employer attitudes with the average index value is 4.40, followed by the use
 123 of alcohol and drugs with the average index value is 4.34. The third factors of accidents
 124 agreed by respondents is improper machine controls which have the average index
 125 value of 4.23, followed by lack of communication, improper safety rules or guidelines,
 126 inadequate maintenance, unsafe conditions of materials, plants and equipment,
 127 improper motivation of operational personnel, ineffective of training instruction. Based
 128 on the value index, majority is agreed that the most factor that causing accidents on the
 129 site is unsafe of employer attitudes while carrying out the works. Because of the
 130 workers may be lack of knowledge and training programs provided by the employee.

131 **4 Discussion on the Findings**

132 **4.1 Understanding safety management system in construction industry**

133 From the findings, 34 out of 35 respondents are implementing the safety management
 134 system on the site with the total of 97% of the respondents agreed in implements of the
 135 safety management in the construction operation. However, findings also shows that
 136 some of the small contractors lack in performing the safety management system. Due
 137 to lack in performing the safety management system, it can lead to risk and hazard that
 138 cause accidents. The uncontrolled of safety and health on construction sites may cause
 139 hazardous conditions go unchecked, which can cause death or serious injuries and
 140 contractor who have bad safety records or perform their work in an unsafe manner are
 141 very culpable [14]. Findings also signifies that the majority of small contractors is not
 142 conducting the training programs for labor on site which means that the labours are not
 143 receiving the adequate knowledge regarding the safety while undertaking the works.
 144 Arocena and Nuñez [15] highlight the importance of good access to public support and
 145 training activities in establishments adopting more comprehensive Occupational Safety
 146 and Health management systems. It can therefore be concluded that lack of knowledge
 147 and resources contributes to the issue of accidents. The result of the findings can be
 148 strengthened based on the study of the ESENER data undertaken by The European
 149 Agency for Safety and Health at Work (EU-OSHA) [16] of all establishments partaking

150 in the survey as they recommends that a lack of resources such as time, staff or money
151 (36 %), a lack of expertise (24 %), and the culture within the establishment (24 %) are
152 several of the main barriers to the application of Occupational Safety and Health
153 management reported by the respondents.

154 Therefore, the small contractors need to overcome this problem through the
155 implementation of the safety management system by way of exploring the knowledge
156 on the safety and allocate the reasonable amount of cost for safety coverage and
157 expenditures as outlined by the OSHA regarding the safety and health while carrying
158 out the construction works. According to Baxendale and Jones [3], the on-cost for
159 smaller sized projects was more substantial as the cost of developing the health and
160 safety plan as it was often disproportionate to the value of the project.

161 **4.2 Safety Management System to Avoid and Control Risk during** 162 **Construction Operation**

163 The implementation of the safety management system to avoid and control the risk
164 during the construction, operation depends on the level of the safety management
165 employed by the contractors. From the findings, most of the small contractors are
166 implementing health and safety for labourers in construction sites, providing the risk
167 assessment on the site and conducting the safety meeting. Further, by just implement
168 health and safety, providing risk assessment, and conduct site meeting it is not enough
169 to avoid and control risk during the construction operation. The contractors need also
170 to have safety committee and a formal of the reporting, recording and investigation of
171 incidents, injuries and illness system to enhance the effectiveness for prediction of
172 future similar events from happening and ways to overcome. Due to the uncompleted
173 system of safety being implemented it will not do any better towards the safety,
174 performance, to reduce the accident rate the small contractors need to have a proper
175 safety management system. Based on their own research and discussions with experts,
176 Gallagher et al. [17] recommend that Occupational Safety and Health Management
177 Systems can deliver more healthy and safe workplaces, but only under the right
178 circumstances. EU-OSHA [18] also finds that the application of Occupational Safety
179 and Health Management Systems can lead to positive effects such as a reduction in
180 accidents and a rise in workers' motivation.

181 However, it may not make sense for small companies to analyze the reasons for
182 absenteeism formally or to appoint a health and safety representative. Many of these
183 companies may have informal approaches and limited resources and expertise [19].
184 According to Hasle et al. [20], smaller sized companies take the less systematic
185 approach to risk management and focus less on preventative measures. The exposure
186 to risk factors at work causes real harm to the health and safety of labourers [21].
187 Therefore, it is an important element that the small contractors need to implement the
188 safety management system to avoid and control the risk.

189 **4.3 Factors of problems in construction sites without safety management.**

190 From the findings, table 5.20 shows there are nine factors that contribute to the issues
191 occur on construction sites without safety management. Most of the respondents agreed
192 that the major factors of problems occur on construction sites without safety
193 management is unsafe of employee's attitudes while commencing the work shows the
194 average 4.40. Kaskutas et al. [22] also found that unsafe behaviour were negatively
195 associated with employer size. The second highest factor is the use of alcohols and
196 drugs shows the average 4.34 which can contribute to the dangers to other people and
197 worker itself. The third highest factor is unacceptable machine controls which it shows
198 the average 4.23. HSE [23] also concluded that worker behaviour is a causal factor in
199 approximately 80% of the accidents.

200 However, the lowest factors of issues occur on construction sites is unsafe ineffective
201 of training instruction. Major numbers of respondents agreed that ineffective of training
202 instruction is not the major factors of issues occur on construction sites. The reason is
203 attitude if the employee itself. Many studies discovered that the majority of accidents
204 and resulting injuries are accredited to unsafe work practices of the workers rather than
205 unsafe working conditions [24]. Therefore, the small contractors need to implement the
206 safety management system to reduce and avoid risk from happen in construction site.

207 **5 Conclusions and Recommendations**

208 It can be concluded that if all eight of the methods is used in implementing the safety
209 into construction sites, the accidents, incidents, risks and hazardous can be minimized
210 and avoided from taking place in construction sites. The safety management system
211 must be developed, implemented and conducted on construction sites in order to lessen
212 the hazards and risks, and can accomplish the objectives of the project. From the data
213 gathered, it can be concluded that the majority numbers of respondents are
214 implementing the safety management system as to control and avoid the risk in the
215 period of construction, operation and also the small contractors are applying the health
216 and safety of the laborers, providing the risk assessments and having safety meeting.
217 Data gathered also shows that other safety management system such as system in
218 managing the hazardous substances, safety committee and recording and investigation
219 of incidents, injuries and illness are less to be undertaken by the small contractors might
220 due to the reason of less knowledge and resources to implement it.

221 In terms of recommendation, small contractors need to apply the safety management
222 methods on all work involved in the construction in order to preventing and controlling
223 the hazards and risks that may happen. Besides that, the contractors need to provide and
224 carrying out the safety training programs and safety training policy to the workers by
225 giving the instruction, providing the knowledge and information regarding the safety
226 management in carrying out works to ensure the workers are alerted for precaution
227 towards emergency situation. Moreover, contractors need to implement the safety
228 planning according to the Occupational Safety and Health management to ensure to
229 achieve the objectives of works without any incidents.

230 Small contractors must provide Personal Protection Equipments (PPE) for all of the
231 workers on construction site according to the suitability of the works for their safety
232 protection. Thus, the level of hazards or risks can be minimized or avoided. The
233 contractors also need to ensure safety management system needs to be developed,
234 implement and conducting in a construction project to achieve the objectives of the
235 projects as well as to avoid any accidents or incidents to the workers. Furthermore, the
236 safety meeting and safety committee need to be developed. This is to ease the procedure
237 to analyse the risks that occurs by having the documentations from previous data of
238 risks to be reviewed for latest risks happened. This is to analyse the risks and suggesting
239 the ways to preventing the risks to be happening. The study also suggests that the small
240 contractors needs to have an adequate amount of resources to implement health and
241 safety management also increase in the level of knowledge regarding the health and
242 safety management to be able to apply it.

243 Small contractors need to develop the safety meeting and safety committee, this is
244 to ease the procedure to analyse the risks that occurs by having the documentations
245 from earlier date of risks to be reviewed for latest risks happened. This is to analyse the
246 risks and suggesting the ways to preventing the risks to be happening. Hence, the risk
247 assessment needs to be provided and implement in order to ensure the risks and hazards
248 are identified, to make sure all aspects of the work undertakings are to be reviewed, to
249 reviewing the operation of plants, machines and equipment control and identify the
250 possibility of the risks and hazards which might happen in construction sites. Thus, the
251 safety inspection, safety audit and safety performance will need to be evaluated
252 continuously to improve the safety management system in the future. The safety
253 inspection and safety review need to be provided to evaluate the operation of safety
254 management system and organization of the project in achieving the objectives.

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