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FACULTY OF ARCHITECTURE,  
PLANNING AND SURVEYING

FULL PAPER  
PROCEEDING



3<sup>RD</sup> UNDERGRADUATE  
**S E M I N A R**  
BUILT ENVIRONMENT & TECHNOLOGY

SEPTEMBER  
**2018**

ISBN 978-967-5741-67-8

FACULTY OF ARCHITECTURE, PLANNING & SURVEYING  
UNIVERSITI TEKNOLOGI MARA PERAK BRANCH  
SERI ISKANDAR CAMPUS

UiTM PERAK @ *Seri Iskandar*

# SPACE MANAGEMENT'S REGARDING SAFETY LEVEL AT CONSTRUCTION SITE

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## **Abstract:**

The purpose of this research is to identify about space management regarding the safety level at a construction site. The accident or injuries occurred on the site have also caused by the improper site space management or site layout planning due to lack of fulfil the safety level requirement. Safety officer and Contractor at construction site should recognize roughly how to improvise space management layout at construction site to avoid any safety hazards or accident occur to all workers. Safety officer also needs to control not only all the workers at construction site, but also to make an assessment of the space management layout at the construction site. The main purpose of assessment of the space management layout is to ensure site layout planning complies the safety level requirement for avoiding safety issues on site. Therefore, about 30 questionnaires had been distributed among selected safety officer and contractor at three selected existing construction sites. The data has been analysed by applying Statistical Package for the Social Sciences (SPSS) through frequency analysis. The finding on space management issues on construction sites were on improper placement of storage material due to insufficient space and crowded, which impact on difficulty of site logistics operations.

**Keywords:** Space Management, Space Management at Construction Site, Roles of Safety Officer.

## **1.0 INTRODUCTION**

Space management is “ a process of skill collaboration of art and sciences knowledge in listing, updating, planning, monitoring, maintaining, reporting and auditing space data with evaluating and re-assessing to maximise the economic value, functionality, occupancy capacity, condition and usability of existing space and minimise the need or requirement for a new space through projecting space requirements, identifying deficiencies, allocating available space to users in an equitable way, monitoring use, assisting users with space usage problems, and resolving space problems in fulfilling facilities management strategic to support the core business of the organization” (Hamdan, 2012). Therefore, the key point of understanding space management definition is the process of maximising and higher optimisation of existing space usage and minimising or reducing the new space requirement in organisation operations (Hamdan, 2012). Space management also related with process of monitoring and supervision of existing physical space on business area or organization occupancy, which it could be a single floor, multiple floors within a building, or multiple floors within multiple buildings. Space management is simple in concept yet far more complicated in practice. (Micromain, 2017).

The most basic benefit of a space management system is answers several basic questions on managing existing space, which are to understand how your organization is using its spaces? What spaces are occupied? Where are certain departments located? Who are the primary occupants of each room? Where people are being placed and how they use each space. All these questions that related to space management will help to assist in the specific departments accountable for the space and resources they use while simplifying the chargeback process (Micromain, 2017).

Most of the study of space management were on existing buildings, however, in this study, it's not focused on existing building but on existing construction site at new development area. These because

only a few studies focusing on space management at construction site planning layout with related on the safety level requirement. This research will investigate the existing construction site with focused on space management site layout planning in determine the site safety regulations compliance.

According to Perez, Schoenefeld and Wainwright (1996) the problem is difficulty in ensuring the proper arrangement and collection of waste materials on-site, workplace becoming over-crowded, lack of adequate storage space and difficulty in ensuring the site is tidy and all plants and materials are stored safely. The other problem is facility layout is to decide the proper positioning of a collection of facilities on a planar sight (Perez, Schoenefeld and Wainwright, 1996). This are the main problem happen on site because many staff on construction site only focuses on profit not the safety and good management. They only think to finish the job without follow the regulation of safety. The objective that has been prepared to achieve is as follows to identify the role of Safety and Health on a construction site in space management and to observe is it safety regulation or act that has been used in construction sites on space management (Dosh, 2007).

## **2.0 LITERATURE REVIEW**

From the year 2005 until 2008 major accidents took place in the Malaysian construction site on each year. They reported in the year 2007, the death of two workers and severe injuries of ten workers at a construction site where the cables of the workmen's lift at the posh condominium and shopping complex project snapped and plummeted 15 meters to the ground (Tan and Abdul, 2014). Many accidents happen at construction site are from the attitude of the workers, which has ignored the safety program at the site. Food safety programs would surely assist in reducing injuries at construction sites and also to minimise construction costs, increase productivity and profitability and more significantly, it could save lives of workers and consequently contribute positively to the construction industry and the country as a whole (Tan and Abdul, 2014). According to Patil and Joshi (2013) Safety and Environmental issues are the most important concerns in every project (Eddie et al., 2004).

According to Boussabaine (1996) accident or injuries on site also happen causes by the space management or site layout not follow the safety level. The site layout plan consists of identifying the facilities needed to support construction operations, determining their size and shape, and positioning them within the boundaries of the site. Construction site layout, involving the assignment of locations for the temporary facilities, is an important planning activity (Chau and Anson, 2002). The acknowledgement that space and its effective management, is essential to successful project management within the construction industry is evident due to the weighting of importance assigned by many site management professions (Spillane and Oyedele, 2013). When the site layout doesn't follow the safety requirement, the accident easily occurs and this might give a problem at the site for example the construction must stop for a while and sometime until a day. In addition, such a problem becomes far from trivial if a construction site is confined due to the lack of available space, or if the site is very large, then travelling between facilities can be considerably time consuming (Shawki, Razek and Maqboly, 2010).

New construction is developing rapidly, we cannot run from this situation. In case of large projects proper planning of layout of roads is important leading from the nearest highway. Internal roads should also be properly planned for easy flow of work (Shetty and Deshmukh, 2013). Site management, in general, involves many tasks, such as site investigation before the construction process starts, material delivery and procurement management to keeping better site records (Elbaltagi, 2014; Whitman, 2014). Safety and Health organization must play their role to make sure the safety on site. The contractor must follow the safety on operation of space management at the site (Riaz et al, 2011). Contractors are required to comply with H&S legislation when: preparing for work (e.g. Planning and organising), setting up a site (e.g. Site access, emergency procedures, reporting injuries and dangerous occurrences) and executing the construction phase (e.g. Site management, mobile plant management and protective equipment monitoring). The target of construction site layout planning is to minimise construction time, cost or required resources (Pem, 2016).

It must create a project with a good work environment in order to attract and retain the best personnel and thus contribute to the better work quality and productivity (Elbaltagi, 2014). Prior to commencement on site, the site setup will include perimeter site hoarding equipped with appropriate safety and way finding signage, lighting installation, and set of site gates for vehicle entrance and another set for pedestrian access to be established (Apollo Education, 2009). Even if no any structures were constructed as temporary road free access to all locations on site must be provided during over-all time-span of accomplishment (Neszmelyi and Veda, 1995).

### **3.0 METHODOLOGY**

To achieve the objective of this study, few methods were applied on how to get the information about Space Management's Regarding Safety Level at Construction Site. In order to know the space management at construction sites, some survey will apply. This will automatically achieve the goals of this research. For the preparation of this research, this chapter reviews the methods used in this study. This research will provide about 5 stages upon to complete the research. It involves the identification of the issues or problems that occurs, literature review, framework of the research, methodology used, analysis and findings, finally the conclusion of the research. The figure below will show the flow of the research methodology involves in this study in order to achieve the objectives which are to identify the role of Safety and Health on a construction site in space management and to observe is it has a safety regulation or act that has been used in construction sites on space management.

#### ***3.1 Stages of Research***

##### *Stage 1: Identification of Issues or Problems*

There are many problems or issues happened in the previous study that has been discussed by the best researcher in order to improve the space management at construction site to avoid many accidents happen during construction works. When this study has been done then, the problem or issue could be found.

##### *Stage 2: Literature Review*

The literature review normally contains about space management toward safety level at a construction site. The information will be gathered from various authors or writers in order to get the information relating to the research topic. The study needs to include all the information which means from the main topic divided by various sub-topic in order to get the specified data about the study.

##### *Stage 3: Data Collection*

After getting all the information about space management toward safety level at the construction site from the first and second phase, the next step is the collecting data which is there are data collections use quantitative methods. In this research study, the data collection method will be the quantitative method which is Safety officer and contractor needs to answer the questionnaire.

##### *Stage 4: Data Analysing and Finding*

Analysing and finding is the most important stage. After all data has been collected, it will be analysed by applied SPSS and processed in order to meet with the objectives of the study.

##### *Stage 5: Conclusion and Recommendation*

The last stage is conclusion & recommendation. This can be made to improve the condition of the study to be better in the future. This chapter concludes from the early chapter until the end chapter.

### **4.0 ANALYSIS AND FINDINGS**

30 questionnaires have distributed and only 10 respondents (33%) participated in the survey. It was considered acceptable to produce trusted results even though the response rate was low.

#### 4.1 Space management regarding the safety level at a construction site.

The space was divided into five groups which are spaced allocation, space access, space security, space facilities and space condition of the construction site.

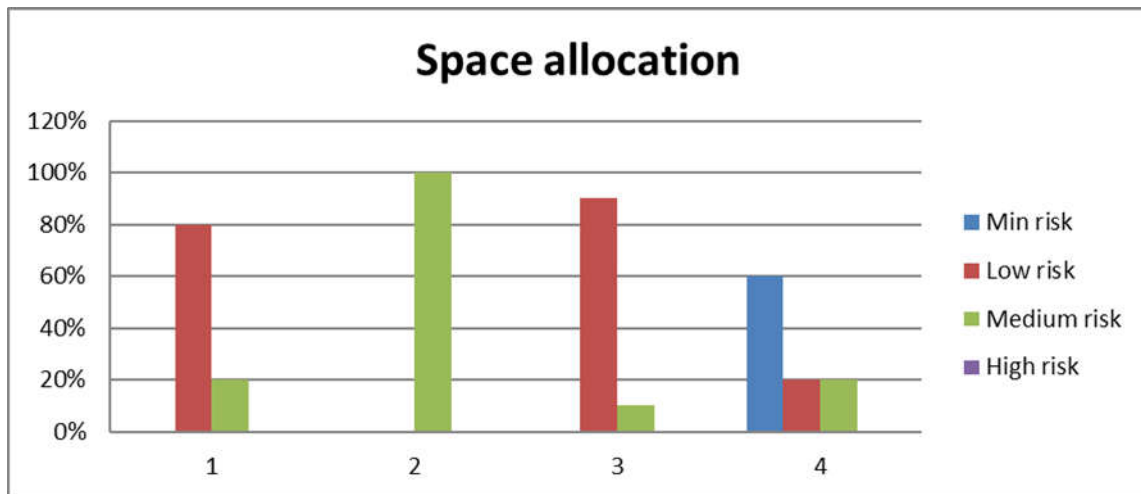


Figure 1: Space and allocation

Based on Figure 1, 80% of the respondent agreed that their location for construction site is low risk. While remaining 20% is medium risk. For location of storage material 100% respondent chooses low risk. Other than that for location of site office at construction site 90% of respondent choose low risk and 10% choose medium risk. 60% of respondent choose main risk for the location of the walkway at a construction site, meanwhile 20% for both low and medium risk.

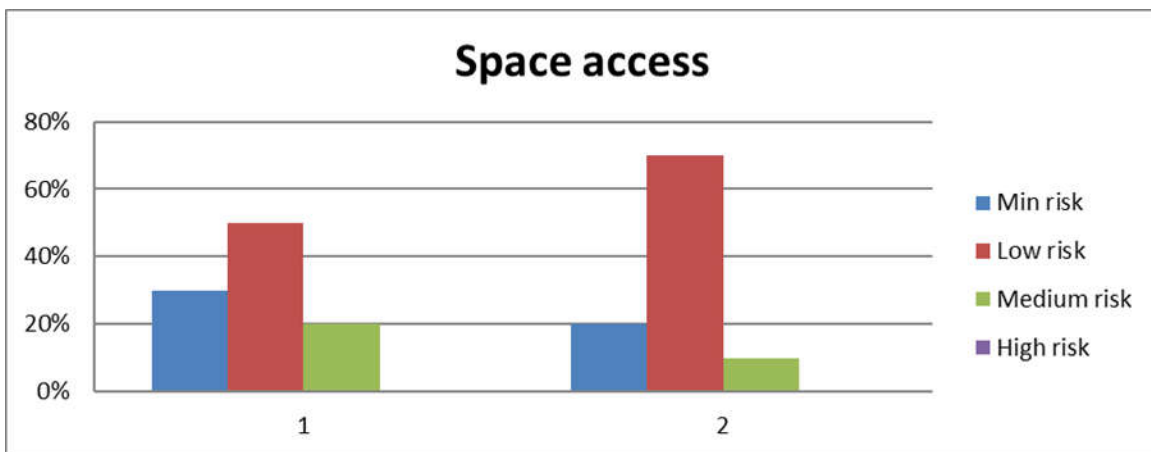


Figure 2: Space access

Figure 2 shows 30% of the respondent choose that Access for transportation to the construction site main risk. 50% choose low risk and another 20% is agreed that are medium risk. To access staff or people to the construction site the respondent chooses 20% is low risk. 70% choose low risk and the rest 10% is choose medium risk.

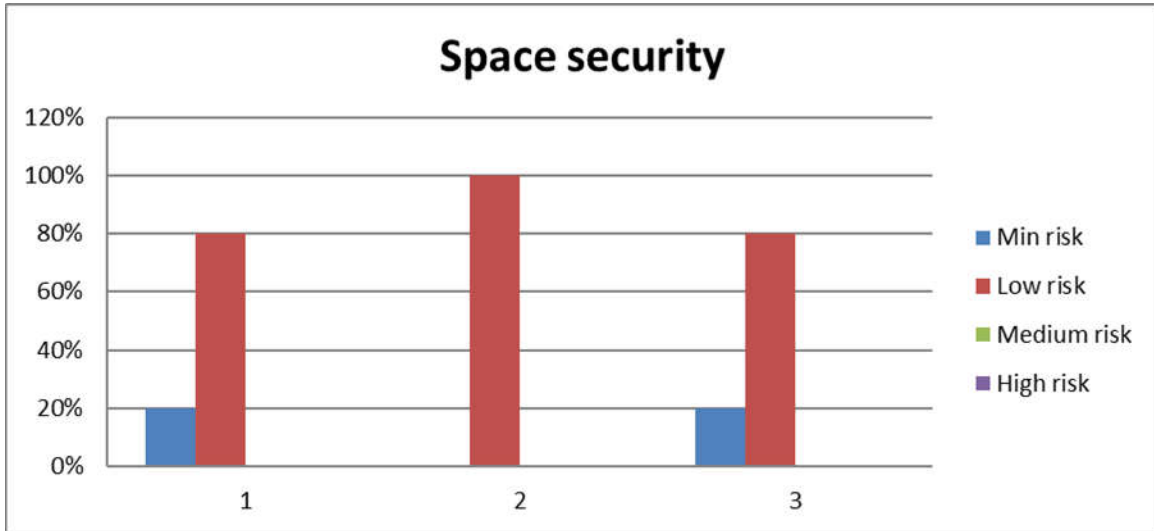


Figure 3: Space Security

Based on Figure 3, location for security guards at construction site 80% of respondent is choose low risk and another 20% is choose main risk. For the hoarding surrounding area of construction site 100% of respondent choose low risk. 80% of respondent choose low risk for space storage protection, security and another 20% is choose main risk.

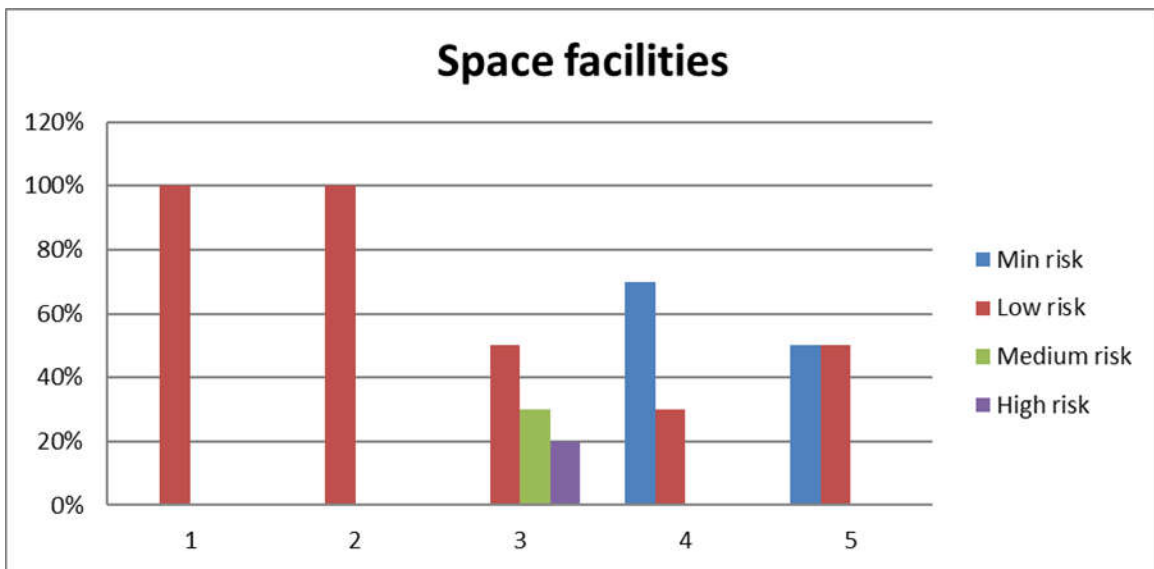


Figure 4: Space facilities

Based on Figure 4, respondent choose 100% lower risk for both toilets for staff and workers at construction site and canteen at the construction site. Walkway for staff go to construction site respondent choose 50% low risk, 30% medium risk and another 20% choose high risk. 70% respondent chooses min risk for wheel wash area for transportation get out of the site and another 30% choose low risk. For workers residing at construction site 50% respondent chooses min risk and 50% choose low risk.

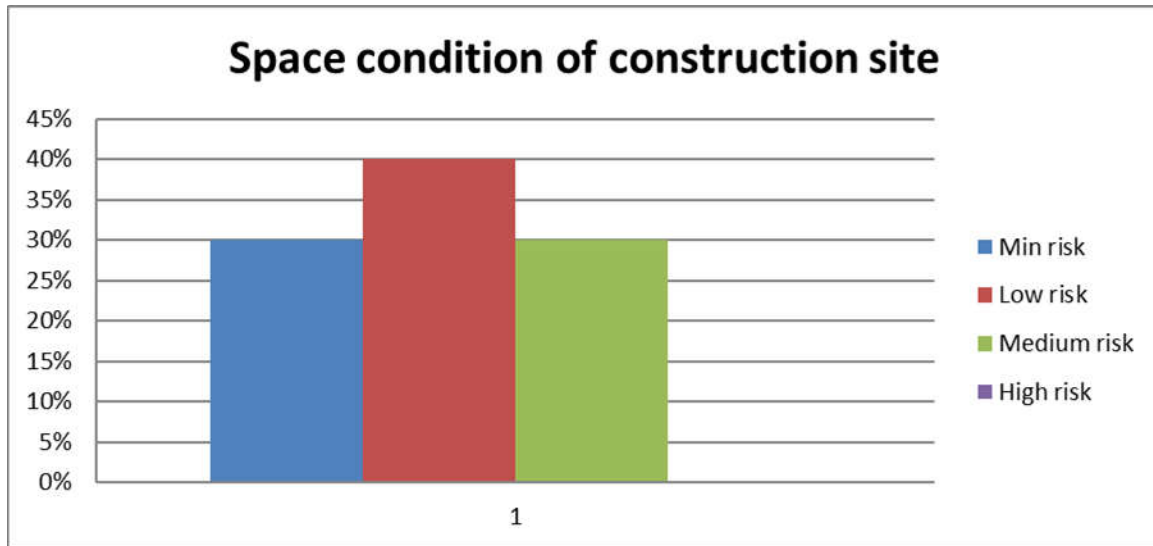


Figure 5: Space condition of construction site

For Figure 5, 40% the respondent choose low risk for overall safety condition at a construction site. Meanwhile, for both min risk and medium risk get the same result 30%.

## 5.0 CONCLUSION

In conclusion the most risky is come from location of storage material. This is due to insufficient space to put construction material at the site. Thus the contractor has to use another space that not specifically for storage area. Thus, this problem can cause difficulty to the movement of the transportation because the pathway becomes crowded. On the other hand the least risk of space security. Location security guard at construction sites can be considered secure because of the location it far from the building structure. Hoarding surrounding area of the construction site is safe due to good quality because has specific material. This can avoid theft and also to protect public from injuries caused by the construction site.

## REFERENCES

- Apollo Education (2009). Site Layout & Traffic Plan. Retrieved 2 November 2017, from [http://planning.croydon.gov.uk/doonline/61373\\_23.pdf](http://planning.croydon.gov.uk/doonline/61373_23.pdf)
- Boussabaine, A.H (1996). An Intelligent Virtual Reality Model for Site Layout Planning. Proceedings of the 13th ISARC, Tokyo, Japan. Pages 493-500.
- Chau, K.W & Anson, M. (2002). A Knowledge-Based System for Construction Site Level Facilities Layout. In: Hendtlass T., Ali M. (eds) Developments in Applied Artificial Intelligence. International Conference on Industrial, Engineering and Other Applications of Applied Intelligent Systems., vol 2358. pp. 393-402. Springer, Berlin, Heidelberg
- Department of Occupational Safety And Health (DOSH) (2007) Guidelines For Public Safety And Health At Construction Sites. Ministry Of Human Resources Malaysia. Retrieved from <http://www.dosh.gov.my/index.php/en/legislation/guidelines/building-construction-engineering-work/669-01-guidelines-for-public-safety-and-health-at-construction-sites-2007/file>
- Eddie W.L. Cheng, H. Li, D.P. Fang, F. Xie, (2004) Construction Safety Management: An Exploratory Study From China. Construction Innovation, Vol. 4 (4), pp.229-241
- Elbeltagi, E. (2014). Site layout planning. Retrieved 2 November 2017 from <http://osp.mans.edu.eg/elbeltagi/R%208-2%20Site%20Layout.pdf>
- Hamdan, W. S. Z. W., Hamid, M. Y., & Radzuan, N. A. M. (2012). Space Management Issues in Higher Education Institutions in Malaysia. In 1st International Conference on Innovation and Technology

- for Sustainable Built Environment 2012 (ICITSBE 2012). Perak, Malaysia: Office of Research and Industrial, Community and Alumni Networking, Universiti Teknologi MARA (Perak).
- Mamat, M.Z. & Zin Mohammad, R (2016). Site Layout Design That Ensures the Efficiency at Construction Site. Retrieved 2 November 2017 from <http://civil.utm.my/wp-content/uploads/2016/12/Site-Layout-Design-That-Ensures-the-Efficiency-at-Construction-Site.pdf>
- Micromain Building Technology (2017). What is Space Management? . Retrieved 2 November 2017 from <https://www.micromain.com/what-is-space-management/>
- Neszmelyi, L. & Vattai, Z. A. (1995). Site Layout Design, Department of Construction Technology and Management Budapest University of Technology and Economic. Retrieved 2 November 2017, from [http://www.ekt.bme.hu/CEngSubj\\_en.shtml](http://www.ekt.bme.hu/CEngSubj_en.shtml)
- Patil, A.D & Joshi, D.A(2013). A Review Paper on Construction Site Layout Planning. International Journal of Innovations in Engineering and Technology, 3(2), pp. 233- 236
- Pem, A & Malyusi, L (2016). Arrangement of material depots at the construction site by using continuous conditions. Organization, Technology and Management in Construction, Vol. 8, pp.1–10
- Perez, J.G, Schonefeld, D.A & Wainwright, R.L. (1996). Solving Facility Layout Problems Using Genetic Programming, Proceedings of the 1<sup>st</sup> annual conference on genetic programming. Page 182-190. Stanford, California — July 28 - 31, 1996. MIT Press Cambridge, MA, USA
- Riaz, Z , Edward, D.J , Holt, D.G & Thorpe, T(2011). Data flow Analysis Of Plant And Equipment Health And Safety Management. Journal of Engineering, Design and Technology, Vol. 9(2), pp.178-203, <https://doi.org/10.1108/17260531111151069>
- Shawki, K.M , Razak, M.E.A.E & Maqboly, S.A(2010). Optimal arrangement of temporary facilities in construction sites. Journal of Engineering Sciences, Vol. 38(4), pp. 949-960,
- Shetty, S.V & Deshmukh, A.R(2013). A Review Paper on Identification of Crucial Site Layout Planning Factors in Construction. International Journal of Science and Research . Vol.4(5),pp. 126-127
- Spillane, J & Oyedele, L(2013). Strategies For Effective Management Of Health And Safety In Confined Site Construction. Australasian Journal Of Construction Economics And Building. Vol. 13(4) , pp. 50-64
- Tan, C.K & Abdul, R.N(2014). Case studies on the safety management at construction sites. Journal of Sustainability Science and Management. Vol. 9(2), pp. 90-108
- Whitman J.B (2014). Construction Site Utilization Planning Best Practices. Retrieved from [https://etd.auburn.edu/bitstream/handle/10415/4008/j.blakewhitmanthesis\\_constructionsiteutilizationplanningbestpractices.pdf?sequence=2](https://etd.auburn.edu/bitstream/handle/10415/4008/j.blakewhitmanthesis_constructionsiteutilizationplanningbestpractices.pdf?sequence=2)