The discrepancy in the construction industry of Malaysia: one of the most contributing industries in Malaysia’s economy and the highest contributor of the fatal accidents

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Abstract. Malaysian construction industry is considered as substantial power for the economy of the country. The value of construction work is increasing year per year. Malaysia's economy experienced a commendable growth the recent years; basically, the construction industry is statistically significant with economic development and has strong linkages with other industry sectors. However, the Malaysian construction industry is facing many challenges especially the fatal accidents. These last came first on top of the construction sector compared all other industries. This article describes the importance of the construction sector for Malaysia's economy and its efficient contribution across all states of Malaysia. Furthermore, detailed statistics and analysis were carried out to describe the severity of fatal accidents occurred in construction industry of Malaysia. Besides, recommendations were listed in order to better manage the construction industry without involving in fatal accidents. By taking into account the significant influence of the construction industry on Malaysian economy, full attention should be given to the construction field by the Malaysian government and improve further the construction management in general and the construction safety in particular.

Keywords. Construction industry; Malaysian economy; Fatal accidents.

1. Introduction and backgrounds of research

In the era of globalization, all countries in the world have to face global competition. Globalization has brought substantial transformation on the economic, political, cultural and environment aspects in the past decades [1] and especially construction [2]. Generally, construction industry is a complex mix of several sectors of the economy. According to Fox, construction industry consists of very complicated and different process with "a large number of specialists, an enormous range of materials, specialist plant and equipment, organisations, and a huge variety of unique products” [3]. Construction sector is not merely a project-oriented industry [4-7] in which construction-related organizations interact and new participants and human relationships take place whenever a new project starts. This sector is also regarded as a knowledge-intensive industry which relies heavily on knowledge input by different participants within the overall project team [7-9]. In the meantime, construction industry is a labour-
intensive business sector which requires the construction manpower to continually seek and apply knowledge for performance improvement' during the course of the project period [10].

Malaysian construction industry is considered as substantial power for the economy of the country. The value of construction work is increasing year per year, where the first and second quarter of 2017 recorded 35.1 billion and 33.8 billion respectively which was a huge growth of 11.2% compared to the previous years [11]. All sub-sectors are leading the expansion in value of construction work such: civil engineering (19.3%), special trades’ activities (11.6%), non-residential buildings (9.7%) and residential buildings (3.8%) sub-sector. In terms of contributions, the performance of value of construction work done is still dominated by civil engineering sub-sector with 35.5%, followed by non-residential buildings (31.2%), residential buildings (28.5%) and special trades activities (4.8%). The construction activity is predominated by the private sector with 64% share (RM21.6 billion) as compared to the public sector only with 36% share (RM12.2 billion) [11]. It can be clearly seen that the construction is one of the main focus of the Malaysian economy.

On the other hand, many authors, researchers and experts have classified the construction as one of the riskiest industries across the [12-14]. According to Demirkesen and Arditi [15], the high management of construction industry have continually sought for new methodologies to strengthen the safety due to the provided high extent of fatal or non-fatal accidents resulted from construction industry. In light of the transient and dynamic environment of construction, associations must have the capacity to rapidly integrate the amendment advised by the new adopted techniques which can prevent injuries [16]. Because of the unsafe workplaces at construction sites, labours often confront potential risks related their health and safety along the whole construction process [17]. Traditionally, the construction safety has been generally estimated and evaluated responsibly by analysing the risk at the workplace and taking an action in order to improve the safety performance [18]. However, dynamic checking of labours’ physiological information with wearable innovation can provide another dimension through “measurement of heart rate, breathing rate and posture” [19].

Malaysia construction industry experienced 453 cases of death investigated by Department of Occupational Safety and Health (DOSH) in the last 6 years as shown in figure 1, where it accounts more than 40% of the total number of fatal deaths across all industries in Malaysia [20]. Moreover, the numbers of construction incidents are increasing with patterns toward bigger scale and more complexity in the design of construction [21], recently the frequency of fatal accident in Malaysian construction is accelerating compared to other industries when the highest death recorded on last year 2016 with 106 dead [20]. This tends to support the significance of the safety of construction projects and search carefully about the causes of the accidents and develop new risk analysis methods to ease the management of the construction safety [22].
2. The importance of construction industry in Malaysia economy

Malaysia’s economy experienced a commendable growth of 4.2% in 2016 as compared to 5.0% in the preceding year 2015. The growth was led by services, manufacturing and construction sectors. However, the decline in agriculture and moderation in Mining & Quarrying sectors weighed down the overall performance in]. Eight states outpaced the national growth in Malaysia (4.2%) in 2016. Economic performance by state 2016 [11] in Malaysia presented in table 1. WP Labuan registered the highest growth in Malaysia by 7.2% compare to all other states followed by WP Kuala Lumpur, Johor, and Pulau Pinang which recorded a growth above 5% with these following percentages (5.9%), (5.7%) and (5.6%) respectively. However, Pahang has gotten the lowest growth of Gross Domestic Product (GDP) in the entire Malaysia compared to the other states by only 2%. The economic structure varies for each state including: Agriculture, Mining & Quarrying, Manufacturing and Services. Service sector was dominated by WP Labuan with 8.2 % compared the overall growth in Malaysia registered only 5.6 %.

The dominance of services sector was observed as well in WP Kuala Lumpur (5.5%), Selangor (6%), Kelantan (5%), Perlis and Perak (5.2%). Equal importance of both Services and Manufacturing sectors could be seen in Pulau Pinang, Melaka, Negeri Sembilan, Terengganu and Johor as shown in the following table 1. On the other hand, Agriculture sector holds a vital share in Kelantan (2.9%), Melaka (3.7%), and Perlis (2.9%). In general, based on the information given table 1, each different state has own special sector growth. However, by the most of states, it can be clearly seen the immense contribution of construction industry in Malaysia economy in 2016 as shown in table 1 and figure 2.

To illustrate, besides the entire Malaysia, there is ten states including; Johor, Kedah, Kelantan, Melaka, Sembilan, Pahang, Penang, Perak, Perlis, and Kuala Lumpur where their construction industry growth is bigger than their Gross Domestic Product growth. While only four states incorporating; Selangor, Terengganu, Sabah, and Sarawak, with their GDP growth conquered the construction industry growth in this regard.

![Figure 2. Comparison between Construction Growth and Gross Domestic Product (GDP) in Malaysia [11].](image-url)
The performance of construction sector was influenced by the expansion in the residential buildings and civil engineering sub-sectors. The construction industry has shown enormous contribution for Malaysian economy as described in figure 2. WP Kuala Lumpur and Selangor led the construction growth in Malaysia. As shown in table 2, three states accounted more than 14% of the state’s economy in 2016 which are Selangor, WP Kuala Lumpur, and Johor. Where, Selangor topped the list with a share of 29% followed by WP Kuala Lumpur (25.5%), Johor (14.2%), Sarawak (6%), Perak (4.8%) Pulau Pinang (4.5%) and Sabah (3.9%) as depicted in figure 3.

| Region      | Agriculture (%) | Mining & Quarrying (%) | Manufacturing (%) | Construction (%) | Services (%) | Gross Domestic Product (GDP) (%) |
|-------------|-----------------|-------------------------|-------------------|------------------|--------------|---------------------------------|
| Malaysia    | -5.1            | 2.2                     | 4.4               | 7.4              | 5.6          | 4.2                             |
| Johor       | -4.6            | 19.4                    | 5.5               | 24               | 5.8          | 5.7                             |
| Kedah       | -8.7            | 15                      | 405               | 15.9             | 5.3          | 3.2                             |
| Kelantan    | 2.9             | 12.1                    | 2.1               | 29.6             | 5            | 4.8                             |
| Melaka      | 3.7             | 19.5                    | 401               | 5.6              | 5.1          | 4.5                             |
| Sembilan    | -6.9            | 19.3                    | 3                 | 9.8              | 5.4          | 3.5                             |
| Pahang      | -6.1            | -33.3                   | 3.9               | 29.7             | 5.4          | 2                               |
| Penang      | -2.8            | 8.7                     | 5.4               | 10.4             | 5.6          | 5.6                             |
| Perak       | -3.5            | 16.7                    | 5.1               | 8.3              | 5.6          | 4.1                             |
| Perlis      | 2.9             | -10.7                   | -2.2              | 9.8              | 4.8          | 3.9                             |
| Selangor    | -6.4            | 28.6                    | 4.3               | -2               | 6            | 4.8                             |
| Terengganu  | -6.1            | 9.2                     | 7.3               | 2.0              | 1.7          | 3.1                             |
| Sabah       | -11.1           | 20.6                    | -3.7              | -3.2             | 5.7          | 4.7                             |
| Sarawak     | -2.5            | -2.8                    | 4.5               | -5.1             | 6.7          | 2.3                             |
| Kuala Lumpur| -1.5            | 9.6                     | 2.8               | 12.8             | 5.5          | 5.9                             |
| WP Labuan   | -3.5            |                         | 7.6               | -18.6            | 8.2          | 7.2                             |

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![Figure 3. Construction Industry Contribution for the Economy by State [11.]](image-url)
Table 2. Construction Industry Contribution for the Economy by State (2016) [11].

| State                      | Percentage share in the state's economic growth % |
|----------------------------|----------------------------------------------------|
| Selangor                   | 29                                                 |
| Kuala Lumpur + Putrajaya   | 25.5                                               |
| Johor                      | 14.2                                               |
| Sarawak                    | 6                                                  |
| Perak                      | 4.8                                                |
| Penang                     | 4.5                                                |
| Sabah                      | 3.9                                                |
| Pahang                     | 3.5                                                |
| Sembilan                   | 2.5                                                |
| Melaka                     | 1.6                                                |
| Terengganu                 | 1.6                                                |
| Kedah                      | 1.5                                                |
| Kelantan                   | 0.9                                                |
| Perlis                     | 0.3                                                |
| WP Labuan                  | 0.2                                                |

Referring to the latest updates about Malaysian quarterly construction statistics, third quarter 2017, the value of construction work done in Q3 2017 grew at 8.1% compared to 11.2% in Q2 2017 to record RM34.5 billion. Where public sector recorded 12.9 billion with 37.4% from the global construction, however, the private sectors dominates with 62.6% a total of 21.6 billion [23]. The value of construction work done in the third quarter 2017 recorded a growth of 8.1% year-on-year to record RM34.5 billion (Q2 2017: RM33.8 billion). As shown in table 3 below, the expansion in value of construction work done was driven by positive growth in all subsectors such as civil engineering (18.0%), special trades’ activities (10.5%), non-residential buildings (2.8%) and residential buildings (1.6%). In terms of contributions, civil engineering sub-sector continued to dominate the performance of value of construction work done with 38.1% share, followed by non-residential buildings (29.2%), residential buildings (28.2%) and Special trades’ activities (4.5%). The private sector continued to propel the construction activity with 62.6 per cent share (RM21.6 billion) as compared to the public sector with 37.4% share RM12.9 billion [23].

Table 3. Quarterly construction statistics, third quarter 2017 [23].

| Domain                      | The expansion was driven by positive growth in all sub-sections, Q3 2017 | Contribution of construction work done, Q3 2017 |
|-----------------------------|-------------------------------------------------------------------------|-----------------------------------------------|
| Civil Engineering           | 18 %                                                                    | 38.1%                                         |
| Special trades              | 10.5%                                                                   | 4.5%                                          |
| Non-Residential Buildings   | 2.8%                                                                    | 29.2%                                         |
| Residential Buildings       | 1.6%                                                                    | 28.2%                                         |
Malaysia is moving forward with the mission of Vision 2020 to become a fully developed country by the year 2020. To cater to this demand, Malaysian government has promoted and implemented various types of competent regulations and policies. In the Third Outline Perspective Plan 2001-2010 (OPP3) for Vision 2020, sustaining economic growth and enhancing international competition become important strategic directions in Malaysian development plan [24]. As a result of the increasing competition from entrants in the domestic and international markets, especially in construction sector which has been proven an immense contribution growth for Malaysian economy. Malaysian industries are urged and advised to make great endeavour for performance effectiveness through better management and organizational technique in construction sectors.

3. Fatal accidents issue in Malaysian construction industry

The construction sector in Malaysia is the third biggest contributor to the 31,943 accident cases referred to the Social Security Organisation (SOCSO) last year. Human Resources Minister Datuk Seri Richard Riot said that the construction sector saw 2,880 cases involving 55 deaths [25]. These statistics were very worrying, it could result in the country losing the workforce, thus affecting development of the whole country especially those statistics involving deaths and losing the human lives. In addition, the ministry seeks to improve the safety procedures in all industry sectors and in first level the construction because this latter is classified as very risky areas, not only for the workers but also to all people in surrounding zones [25]. In conjunction with his working visit to the Parcel F construction site, Richard Riot was speaking at a press conference after launching “the Construction Industry Work Safety and Health Guideline Management 2017”[25]. Last year 2016, over than 9,544 construction projects were checked during the construction work, it is managed to take punitive action against 12,825 cases [26].

Through the statistics provided by DOSH, a short calculation was done about the latest 100 fatal accidents in all Malaysia industry. The majority of fatal accident was occurred in the construction industry which recorded 50 cases, while the rest of the industry recorded 50 fatal cases as shown in table 4. It can be seen clearly the severity of construction sector in Malaysia compared to the other industries.

**Table 4.** Fatal accidents occurred in malaysian industry sectors from 12/06/2015 to 11/09/2017 [27].

| Type of industry sector | Number of fatal accidents |
|-------------------------|---------------------------|
| All industry sectors in Malaysia | 100 |
| Construction industry (i.e. fall from height) | 50 |
| Other industries (i.e Manufacturing, Agriculture etc) | 50 |

Furthermore, 32 % of the recorded fatal accidents have not gotten any causes according to the report issued by DOSH [27], while 21 % of these fatal accidents were occurred because of unsafe working procedures, different reasons were given about 47 % of the fatal accidents as shown in figure 4.
Malaysia construction industry experienced 453 cases of death investigated by Department of Occupational Safety and Health (DOSH) in the last 6 years as shown in table 5, where it accounts more than 40% of the total number of fatal deaths across all industries in Malaysia [20].

Table 5. Death Statistics by Sector [20].

| Sector          | Year | Manufacturing | Mining & Quarrying | Construction | Agriculture, Forestry, Logging & Fishery | Utility | Transport, Storage & Communication |
|-----------------|------|---------------|--------------------|--------------|----------------------------------------|---------|-----------------------------------|
|                 | 2011 | 45            | 7                  | 51           | 41                                     | 5       | 11                                |
|                 | 2012 | 40            | 7                  | 67           | 38                                     | 5       | 22                                |
|                 | 2013 | 58            | 5                  | 69           | 33                                     | 7       | 8                                 |
|                 | 2014 | 45            | 15                 | 72           | 42                                     | 0       | 15                                |
|                 | 2015 | 46            | 4                  | 88           | 31                                     | 6       | 22                                |
|                 | 2016 | 59            | 4                  | 106          | 25                                     | 2       | 13                                |

Moreover, the numbers of construction incidents are increasing with patterns toward bigger scale and more complexity in the design of construction [21]. Recently the frequency of fatal accident in Malaysian construction is accelerating compared to other industries when the highest death recorded on last year 2016 with 106 dead [20]. Which tend to support the significance of the safety of construction projects and search carefully about the causes of the accidents and develop new risk analysis methods to ease the management of the construction safety [28].

According to National Institute of Occupational Safety and Health (NIOSH) more than 80% of accidents were not reported at Malaysian construction sites [29]. The National Institute of Occupational Safety and Health (NIOSH) has urged employers to report all accidents at the workplace even ‘near misses’ to the Department of Occupational and Safety Hazard (DOSH) in order to proceed thoroughly assessment, and thus, to improve the safety policy and protect human lives and the county development in this sector accordingly. NIOSH chairman Tan Sri Lee Lam reported that between 2009 and 2014, less than 20 % of accidents at construction sites nationwide were forwarded to DOSH [29]. A review, carried out by researchers from NIOSH and two public universities, revealed that only 787 out of 31,347 accident cases which occurred in the construction industry were investigated by DOSH. Employers have tried to keep some case unreported, but the big gap between the number of cases that occurred and the numbers that were investigated showed that many cases have gone unreported [29]. After launching the state-level World Health and Safety Day at NIOSH, Lee reported
the matter accordingly to optimize the collection and use of Occupational Safety and Health data wisely in order to improve this sector [29].

4. Discussion and recommendations

Construction industry is statistically significant with economic development and has strong linkages with other industry sectors. They further acknowledged that construction industry is a vital sector in the growth and expansion of economic in developing countries like Malaysia. Thus, since the construction sector plays an important role in the development of Malaysian economy, it is imperative for Malaysian construction industry to sustain competitiveness at the local and international levels. In order to Malaysian construction industry becomes a competitive sector, it is imperative for construction-related firms to upgrade their capability to control the fatal accidents and improve their safety management accordingly. It can be seen clearly that the construction industry has substantial value for Malaysian economy and considered as one of the biggest supporting sectors for Malaysian development. However, the construction industry has been considered as the highest risky workplace recently due to the high frequency of fatal accidents. The records of safety in Malaysian construction industry are considered very poor recently. Nowadays, the accident rate in Malaysian construction industry is very high and been classified at the severity level. It is inevitable to investigate about the causes of accidents and look for the new methods to strengthen the safety of the employees to realize safety performance in Malaysian construction industry. By considering the analysis in figure 4, 32 % of the recorded fatal accidents have not gotten any causes according to the report issued by DOSH [27], while 21 % of these fatal accidents were occurred because of unsafe working procedures, different reasons were given about 47 % of the fatal accidents.

It seems that further improvement should be integrated the safety assessment in order to identified the main reasons that lead to these fatal accidents. Indeed, the unsafe behaviors contributed in 88% of accidents affected the construction projects, in the other hand only 10% of accidents are caused by unsafe condition [30] and that risky condition of workers are easier to allocate than unsafe behaviors [31], the management of construction projects must significantly reconsider the efforts in implementation of construction management safety toward the end of dangerous behaviors. The labors’ safety acts need to be closely inspected and adjusted if necessary to end their unsafe behaviors. However, it is a big challenge to quantify the labors’ safety behavior and attitude, hence, the effect of safety implementation on labors’ behaviors shall be well assessed.

5. Conclusion

In the light of vision Malaysia 2030, Malaysia is seeking to be a developed country. In order to make the dream true, a substantial care was given to economy by the current government. The construction is considered as one of the pillars of Malaysia economy. This research proves the efficient role of construction sector of Malaysia and its positive influence on the Malaysia’ economy recently. The outcomes show that there is a solid connection between the economy growth and the construction field in all states of Malaysia. The gross domestic product is considerably supported by the construction benefit financial outcomes. On the other hand, during the last decade, the construction industry is riskiest industry in Malaysia by resulting the highest rate of fatal accidents among all industries. This is due to the lack implementation of risk assessment practices and poor of safety regulation and procedures. The implementing safety regulations in the workplace to prevent all laborers must be compulsory for all construction organizations in particular and government which is presented by the ministers of both manufacturing and economy in general. Further researches are required to tackle the high frequency of fatal accidents in construction industry and maintain the economic benefits of the construction for Malaysia’s economy.
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References

[1] Held, D., Mcgrew, A., Goldblatt, D., and Perraton, J 1999 Global Transformations. Revn, 22 7.
[2] Stasiak-Betlejewska, R., and Potkány, M 2015 Construction costs analysis and its importance to the economy. Procedia Econ. Financ, 34 35.
[3] Fox, P., and Skitmore, M 2007 Factors facilitating construction industry development. Build. Res. Inform. 35 178.
[4] Chan, J. K., Tam, C. M., and Cheung, R. K. 2005 Construction firms at the crossroads in Hong Kong: Going insolvency or seeking opportunity. Eng. Const. Arch. Man. 12 111.
[5] Egbu, C. O 2004 Managing Knowledge and Intellectual Capital for Improved Organizational Innovations in The Construction Industry: an Examination Of Critical Success Factors. Eng. Const. Arch. Man. 11 301.
[6] Ellis, G. F., Murugan, J., and Tsagas, C. G 2003The Emergent Universe: an Explicit Construction. Class Quantum Gravity. 21 233.
[7] Fong, P., and Chu, L 2006 Exploratory study of knowledge sharing in contracting companies: A sociotechnical perspective. J. Constr. Eng. Manage. 132 928.
[8] Carrillo, P., Robinson, H., Al-Ghassani, A., and Anumba, C 2004 Knowledge Management in UK construction: Strategies, Resources and Barriers. Proj. Manag. J. 35 46.
[9] Hari, S., Egbu, C., and Kumar, B 2005 A Knowledge Capture Awareness Tool: An Empirical Study on Small and Medium Enterprises in the Construction Industry. Eng. Const. Arch. Man. 126 533.
[10] Jawahar Nesan, L 2004 Efficacy-Information for Implementing Learning in Construction. The Lear. Organ. 11 45.
[11] Department of Statistic Malaysia (Dosm) 2017a GDP by State, 2010-2016. Department of Statistics Malaysia (Dosm)
[12] Dong, W., Vaughan, P., Sullivan, K., and Fletcher, T 1995 Mortality study of construction workers in the UK. Int. J. Epidemiol. 24 750.
[13] Sacks, R., Rozenfeld, O., and Rosenfeld, Y 2009 Spatial and temporal exposure to safety hazards in construction. J. Constr. Eng. Manage. 135 726.
[14] Fam, I. M., Nikoomaram, H., and Soltanian, A 2012 Comparative Analysis of Creative and Classic Training Methods in Health, Safety And Environment (Hse) Participation Improvement. J. Loss Prev. Process Ind. 25 250.
[15] Demirkesen, S., and Arditi, D 2015 Construction safety personnel's perceptions of safety training practices. Int. J. Proj. Manage. 33 1160.
[16] Hallowell, M. R 2011 Safety-knowledge management in American construction organizations. J. Manage. Eng. 28 203.
[17] Seo, J., Han, S., Lee, S., and Kim, H 2015 Computer vision techniques for construction safety and health monitoring. Adv. Eng. Inform. 29 239.
[18] Hallowell, M. R., Hinze, J. W., Baud, K. C., and Wehle, A 2013 Proactive construction safety control: Measuring, monitoring, and responding to safety leading indicators. J. Constr. Eng. Manage. 139 04013010.
[19] Cheng, T., Migliaccio, G. C., Teizer, J., and Gatti, U. C 2012 Data fusion of real-time location sensing and physiological status monitoring for ergonomics analysis of construction workers. J. Comput. Civ. Eng. 27 320.
[20] Department of Occupational Safety and Health (Dosh) 2017a Occupational Accidents Statistics by Sector. Department of Occupational Safety and Health
[21] Lee, H. S., Lee, K. P., Park, M., Baek, Y., and Lee, S 2011 Rfid-Based Real-Time Locating
System for Construction Safety Management. *J. Comput. Civ. Eng.* **26** 366.

[22] Hinze, J., Pedersen, C., and Fredley, J 1998 Identifying root causes of construction injuries. *Int. J. Constr. Proj. Manag.* **124** 67.

[23] Department Of Statistic Malaysia (Dosm) 2017b Quarterly Construction Statistics, Third Quarter 2017. *Department Of Statistics Malaysia*

[24] Khan, R. A., Liew, M. S., and Ghazali, Z. B 2014 Malaysian construction sector and Malaysia vision 2020: developed nation status. *Procedia Soc Behav Sci.* **109** 507.

[25] Malaymail Online 2017 Construction sector third largest contributor to accident cases, minister says. *Malaymail*

[26] Bernama 2017 Construction sector third largest contributor to accident cases. *Malaymail*

[27] Department of Occupational Safety and Health (Dosh) 2017b Fatal Accident Case. *Department of Occupational Safety and Health.*

[28] Hinze, J., Thurman, S., And Wehle, A 2013 Leading Indicators of Construction Safety Performance. *Saf. Sci.* **51** 23.

[29] Kim, C. B. 2017 Eighty Per Cent Of Accidents At Malaysian Construction Sites Go Unreported: Niosh. *New Straits Time.*

[30] Heinrich, H.W., and Granniss, E.R 1959 *Industrial Accident Prevention: A Scientific Approach*, Fourth Ed. Mcgraw-Hill, New York.

[31] Gould, F., Joyce, N 2009 *Construction Project Management*, third ed. Pearson, USA.