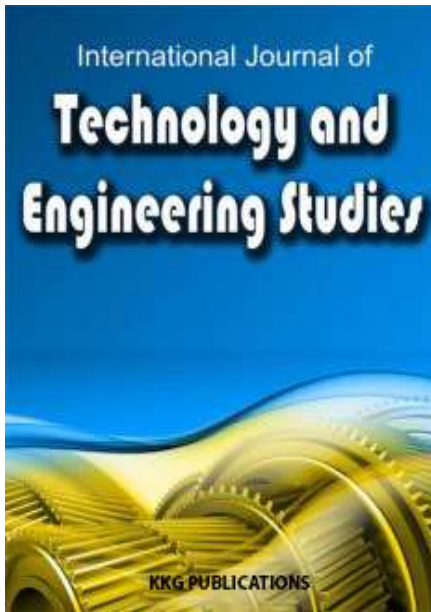


This article was downloaded by:
Publisher: KKG Publications



Key Knowledge Generation

Publication details, including instructions for author and

Subscription information:

<http://kkgpublications.com/technology/>

The Importance of Standard Method of Measurement in Indonesian Construction Industry

SENG HANSEN ¹, ARDITYA RESTU SALIM ²

^{1,2} Podomoro University, APL Tower 5th Floor Jakarta – Indonesia

Published online: 05 December 2015

To cite this article: S. Hansen, A. R. Salim, “The importance of standard method of measurement in Indonesian construction industry,” *International Journal of Technology and Engineering Studies*, Vol. 1, no. 4, pp. 122-127, 2015.

DOI: <https://dx.doi.org/10.20469/ijtes.40003-4>

To link to this article: <http://kkgpublications.com/wp-content/uploads/2015/12/IJTES-40003-4.pdf>

PLEASE SCROLL DOWN FOR ARTICLE

KKG Publications makes every effort to ascertain the precision of all the information (the “Content”) contained in the publications on our platform. However, KKG Publications, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the content. All opinions and views stated in this publication are not endorsed by KKG Publications. These are purely the opinions and views of authors. The accuracy of the content should not be relied upon and primary sources of information should be considered for any verification. KKG Publications shall not be liable for any costs, expenses, proceedings, loss, actions, demands, damages, expenses and other liabilities directly or indirectly caused in connection with given content.

This article may be utilized for research, edifying, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly verboten.

THE IMPORTANCE OF STANDARD METHOD OF MEASUREMENT IN INDONESIAN CONSTRUCTION INDUSTRY

SENG HANSEN ^{1*}, ARDITYA RESTU SALIM ²

^{1,2} Podomoro University, APL Tower 5th Floor Jakarta – Indonesia

Keywords:

Standard Method of Measurement
Advantages
Challenges
Indonesia.

Received: 16 August 2015

Accepted: 18 October 2015

Published: 05 December 2015

Abstract. This research has two objectives, i.e. (i) to identify the advantages of implementing the Standard Method of Measurement (SMM) in Indonesia and (ii) to identify the challenges in implementing this Standard Method of Measurement (SMM) in the Indonesian construction industry. The research method used for this report was comprehensive literature from several countries that have already adopted this SMM and field observations. The results are presented in tables, and the benefits of adopting this measurement method i.e., SMM to advance the Indonesian construction industry are also highlighted. The findings show that there are at least 13 (thirteen) direct benefits and 3 (three) indirect benefits of implementing Standard Method of Measurement in Indonesia. The main benefit is to provide a foundation for measurement principles in the construction industry. The findings imply that with the government's plan to increase construction projects for 2015 – 2019 development, this standard does not solely serve efficient construction measurement. However, it can also be used to control the project's finance and prevent corruption.

INTRODUCTION

Construction industry has always been considered as a high risk industry where there are so many inter-dependent factors that influence each other. One of these risks is the cost-related risk. As what has been practiced worldwide, in entering a construction project and getting the estimated construction cost, a precise and detailed Bill of Quantity (BQ) is needed. In short, a Bill of Quantity can be defined as a document which lists all required materials, parts, and labor for a construction project to be done. Two important aspects are always there to be sought by the quantity surveyors, i.e. the volume (quantity) and the unit rate of the work item. Volume can be taken off from the drawings while the unit rate comes from the unit rate analysis for each work items. However the problem arises when there is no standardization in measuring the work item's volume from the drawings. When there is no standard which governs how a drawing can be taken off and measured, the quantity calculation may become error or non-uniform which at the end will constitute a risk. This risk actually can be minimized with the availability of a Standard Method of Measurement (SMM).

A Standard Method of Measurement (SMM) can be defined as a document which is recognized by the government as a guidance in measuring the construction work. It will set up uniform principles in measurement so that it will give both parties (employer and contractor) the same perspective in measuring the work. Therefore, SMM is one of the most

important standards in construction industry. Without it, the analysis and comparison of construction costs may involve a tedious work. Several countries have already published their own versions of Standard Method of Measurement, such as the United Kingdom (with SMM7, CESMM3, and MESMM), Hong Kong (with SMM7 and SMM for building elements), Australia (with SMM5), Malaysia (with SMM2, CESMM3, and My CESMM), and South Africa (with Standard System of Measuring Building Works).

Meanwhile as a country that has an enormous increase in construction outputs, Indonesia still does not have a Standard Method of Measurement that will provide a foundation about the measurement principles which can be used to measure the design drawing's volume as well as the actual work's volume. Without the availability of this standard, there are many quantity-related arguments and cost-related disputes that arise from the execution of a construction project. Both parties to contract and their quantity surveyors may have some arguments in doing the measurement works and there is no reference for them to settle their arguments. This will lead to confusion and even disputes which will decrease the productivity and value of the construction process.

Having identified this problem, Indonesia needs to start developing this standard. Especially with the government's plan to increase construction projects for 2015 – 2019 development, this standard does not solely serve for efficient construction

* Corresponding author: Seng Hansen
E-mail: seng.hansen@podomorouniversity.ac.id

measurement, but it also can be used to control the project's finance as well as to prevent corruption.

LITERATURE REVIEW

With the implementation of standardization, consistency will be achieved. This will result in decrease of conflict among the parties involved in a construction project. According to [1], the main purpose of adopting standardization is to develop a specific level of conformity. According to them, standardization has contribution to increased productivity.

Moreover, Standard Method of Measurement is a standard document that is being localized in order to fit with the local custom and industry practice [2], [3], [4]. However the implementation of this standard in several countries is not without their critics. Different perspectives on this issue have

been discussed by professionals and practitioners in the industry. For example [5] identified that inadequate industry consultation during the development of Standard Method of Measurement contributed to the ineffectiveness of SMM implementation. Another critique is attributed to [6] which stated that if the method of measurement is not delivered in detail, it can cause disputes.

[7] examined the methods of utilization of standard methods of measurement in some developed countries and proposed new directions for the domestic standard method of measurement in South Korea. The result of the current status of the SMM of each country they researched is shown in the table 1 below.

TABLE 1
CURRENT STATUS OF SMM IN SEVERAL COUNTRIES

| Country | Comparison Analysis |
|----------------|---|
| Australia | To provide a uniform basis of measurement |
| Canada | Work measured as net in position |
| Ireland | Allows for the provision of Location Drawing and Bill Diagrams to aid the descriptions of time |
| United Kingdom | Location to be provided in descriptions unless evident from drawings or other information required to be provided by these rules |
| Singapore | To provide a uniform basis of measurement and to enable the exchange of data between SMM, National Productivity and Quality Specifications CAD drawings |

[8, 9] have investigated the current industry issues which are surrounding the application of current Malaysian Standard Method of Measurement (MySMM) as a single standard system of measurement. Literature review and an exploratory semi-structured interview approach were conducted.

The outcome is that there are several issues in SMM implementation which need to be overcome. They are as follows:

- Complicated rules and description which will confuse the users.
- Lack of clarity in describing the meaning of the items and the rules of measurement.
- Some of the important measurement rules or items of work are not highlighted.
- Existence of construction terms which are not user-friendly to some non-technical persons.
- Some elements fail to acknowledge builder's knowledge, measurements are not in line with the nature of contractor's costing.
- Heavily biased towards tendering rather than administrative cost control purposes.
- Inadequate industry consultation during the development process.
- Paragraph format is not in line with QS software technology (BIM).

There is little literature that describes the benefits and necessity of Standard Method of Measurement in Indonesia. [10] described several benefits of this standard, namely:

- to minimize the potential of conflict arisen from the different interpretation of measurement method and work description,
- both parties (employer and contractor) will understand the minimum requirements of the construction project when they are making the BQ,
- risk distribution between both parties will be easily understood,
- it will improve the effectiveness of construction project control and contract administration,
- since the contractors will use the same measurement method, tender price will become more competitive and tender documents can be easily compared with one another.

Moreover, Hansen also suggested that in drafting and developing this Standard Method of Measurement in Indonesia, the drafting team must adapt it to the construction industry's local wisdom and practices so that it will be easily socialized, accepted and implemented by all players in the industry.

METHOD AND MATERIALS

The research method used for this study is mainly based on literature reviews and field observation. Literature review is based on books, journals and standards that aimed to develop research insights. In order to make a comprehensive and effective review, the selection of literature was based mainly on those relevant researches in the last past 13 years (2002-2015) and from the various standard methods which have already been

implemented in several countries. Field observations were done during the periods when the first researcher became a practitioner in a government-owned construction company for 5 (five) years. Two more in-depth observations were made when he was involved in Quantity Surveying Awareness Program conducted by Indonesia Ministry of Public Works and Public Housing in September – October 2015 period. First observation was done in Padang City (7-8 September 2015) and second observation was done in Gorontalo City (22-23 October 2015). Program participants included ministry's employees, contractors, and consultants. Group discussions were conducted in order to gain participants' opinions regarding the current condition and the necessity of implementing a Standard Method of Measurement in Indonesia.

RESULTS

The Current Condition

The current condition in Indonesia is that there is still no Standard Method of Measurement which applies nationwide. Generally the players in this industry (both employers and contractors) have their own in-house departments which produce

their own version of Standard Methods of Measurement. Besides, they may hire professional QS firms which have already produced their own versions of this standard. These standards differ greatly from one another and therefore they do not resolve problems related to measurement conflicts and cost-related disputes. Knowing this problem, the Indonesian government through the Ministry of Public Works and Public Housing has already attempted to facilitate the development of QS awareness and one of them is by preparing a standard method which will be implemented in Indonesia. However there are still many different opinions which questioned whether or not this standard method should be applied in Indonesian construction industry. This study is conducted in order to answer this question.

The Advantages of Implementing Standard Method of Measurement in Indonesia

The major benefit is that it will provide a foundation for measurement principles in the construction industry. It will set out a more efficient way in doing taking-off and drafting a detailed Bill of Quantity. The benefits can be classified into 2 (two) categories, i.e. the direct benefits and the indirect benefits.

TABLE 2
THE DIRECT & INDIRECT BENEFITS OF IMPLEMENTING STANDARD METHOD OF MEASUREMENT

Direct Benefits of Implementing Standard Method of Measurement

For all parties involved:

- Provide consistency, accuracy, and uniformity for measurement principles
- Provide efficient cost control
- Provide efficient reviewing process by third party
- Provide better Bill of Quantity arrangement
- Provide data for cost analysis
- Improve productivity
- Minimize unnecessary disputes

For employer:

- Provide competitive tender price
- Provide reliable tender price
- Provide efficient control of the payment

For contractor:

- Provide a fair tender price where almost all risks have already been set out
- Assist in pricing
- Saved from costly exercise

Indirect Benefits of Implementing Standard Method of Measurement

- Provide a good source for public education especially in construction/built environment discipline
- Provide a good reference for third party (the court, the arbitrator, the negotiator) to settle cost-related disputes
- Advance the construction industry practice

The Challenges in Implementing Standard Method of Measurement in Indonesia

Since Indonesia still does not have any Standard Method of Measurement which is applied nationwide, the need for

adopting and implementing a Standard Method of Measurement becomes imperative. However this is not without any challenges. Several challenges are shown in table 3 below.

TABLE 3

THE CHALLENGES IN IMPLEMENTING STANDARD METHOD OF MEASUREMENT IN INDONESIA

| | |
|---|--|
| No regulation and enforcement body | Applicability |
| Difficulty in developing a simple, precise, compact, and detailed SMM which will be easily understood | Acceptable |
| Lack of understanding | Adaptability |
| Lack of socialization | Local conformity |
| Various informal SMM versions by in-house or outside QS firms | Reluctant to change the current practice |

DISCUSSION

The main benefit of implementing a Standard Method of Measurement is that it will provide a foundation for measurement principles such as consistency, accuracy and uniformity. Consistency means that with the usage of standard method, it will produce a Bill of Quantity which is far more consistent since works are adequately itemized and described in a regular way. Moreover, since this standard method is developed by all key players and professionals in the industry, almost all considerations that are related to the accuracy of the measurement have been considered. While uniformity means that this standard method will provide a uniform basis for the measurement of construction works as well as for the presentation of measurement units in Bill of Quantity no matter who will draft the bill. This in fact will ease the quantity surveyor or cost estimator in making a Bill of Quantity since the work item will normally be the same with the ones in standard method.

By implementing this standard method of measurement, efficient cost control can be achieved. Moreover, with the same understanding of measurement principles, it will absolutely help for the reviewing process by third party such as arbitrators or judges when cost-related disputes arise. Since it will create a systematic and uniform structure for the bill, it will eventually produce a better Bill of Quantity arrangement. This especially can be identified with the usage of coding system and simplification. Furthermore, this coding system will simplify computerized data processing which is part of construction development trend that cannot be avoided.

Due to the detailed nature of Standard Method of Measurement, it also serves as data for cost analysis by quantity surveyors. For many, it will increase productivity by saving time in doing measurement and calculation. With the same understanding over measurement principles, both parties will be less likely to argue over unnecessary disputes. It will minimize variation orders since almost all work items have already been provided in this standard. Overall, it will improve the

effectiveness and productivity by minimizing the conflict of miscalculation.

As for the employer's benefits, with the implementation of this standard it means that contractors who are participating in a tender will submit more reliable tender prices which are close enough to the employer's estimation. In preparing their tender prices, contractors will use the same Standard Method of Measurement and therefore their tender prices will be close to each other. For the employer, this creates a competitive tender price. On the other hand, employer will have the easiness to justify which contractor gives the best offer. When contractor has been appointed and project has been started, employer can use this standard to calculate and evaluate any contractor's progress, payment claims, variation orders, and final account. It will serve as a fair and convenient basis for valuing the payments so that employer will easily manage his financial condition.

Meanwhile, this standard will assist contractors in pricing their tenders. Contractors will use the same method of measurement which means that their measurement will be more reliable and can be accepted by the employer. With the usage of this standard, contractors are saved from costly and timely exercise which was normally done before. Contractors can also minimize their risks of miscalculating and misunderstanding over work items, so that contractors can concentrate fully on finishing their job rather than engaging in unnecessary disputes.

Since Indonesia still does not have this kind of standard, its implementation will serve as a guidance and reference for parties involved in the construction industry especially when there is a conflict regarding measurement principles. It will provide a good reference for third party (i.e. the court, arbitrator or negotiator) to settle quantity and cost-related disputes. It can also be used by students in construction related disciplines such as civil engineering, architecture, and construction management to gain a fundamental understanding of measurement principles for construction works. At the end, the implementation of this standard will advance Indonesian construction industry practice.

However the implementation of this standard is not without critics. Major disadvantage of this standard is that it will always need to be revised and updated. There are several reasons for this i.e. the need to provide a more balanced and detailed work item description, the need to provide a more systematic structure of bill's items, the need to improve the contents of BQ,

and the need to consider the recent techniques, technologies, and new conditions of contract.

The implementation of this standard also faces some challenges. Table 4 below shows some challenges in implementing this standard method in Indonesia.

TABLE 4
CHALLENGES IN IMPLEMENTING STANDARD METHOD OF MEASUREMENT IN INDONESIA

| Challenges | Description |
|---|---|
| No regulation and enforcement body | Since there is still no regulation which governs and enforces the usage of this standard in Indonesian construction industry, it poses major challenge for the industry that is reluctant to change today's practice. Therefore government should make it mandatory for the implementation of this standard and regulate the usage of this standard. |
| Difficulty in developing a simple, precise, compact, and detailed SMM which will be easily understood | Since this standard will be used nationally, the government and the team who will develop and draft this standard method will need to make this standard as simple, precise, compact, and detailed as possible. The drafting team also needs to realize the difficulties to make a realistic relationship between construction work method, quantity, and cost in detail. Therefore the team should consist of professionals and practitioners who are experts in this industry. |
| Lack of understanding | Lack of understanding of the importance and beneficial effects of implementing Standard Method of Measurement. This study aims to provide the answer related to the importance and advantages of implementing a Standard Method of Measurement. |
| Lack of socialization | If this standard has already been published to be used nationally, then government and enforcement body need to socialize this standard so that it can be beneficial as it should be. Socialization should be gradual and sustainable, and it should involve various stakeholders including the government, the industry, and the related educational institutions. |
| Various informal SMM versions by in-house or outside QS firms | The current practice is that there are various standard methods which differ greatly from one another. These standards are produced by in-house QS departments (of big developers or contractors) and professional QS firms. |
| Applicability | This means that the standard being made must be applicable enough for the construction industry. Therefore in making this standard, government and the drafting team must come from professionals and practitioners who are experts in this industry. |
| Acceptability | This means that the standard must be acceptable to all players in this industry. Therefore equality and fairness in terms of measurement for both employer and contractor need to be considered. This standard must be free from conflict of interest and it must be of neutral nature. |
| Adaptability | This standard also needs to be able to adapt to any construction procurement types. For more advance development, this standard can be published in 3 (three) distinct standard methods, i.e. Standard Method of Measurement for building works (SMM), Standard Method of Measurement for civil engineering works (CESMM), and Standard Method of Measurement for mechanical, electrical and plumbing works (MEPSMM). The best practice is to adopt the international standard methods. |
| Local conformity | However in adopting international standard methods, the drafting team needs to understand the local wisdom and practices in Indonesia so that they can produce a standard which is compatible with Indonesian construction industry practice. By doing so, the socialization and enforcement of this standard will be easier and more acceptable to all players in this industry. |
| Reluctant to change the current practice | One of the major challenges is the lack of understanding so many players are reluctant to change the current practice. Some players may find that Indonesia does not need this standard yet and find difficulties in learning this new standard. Therefore, government should enforce and regulate the use of this standard. |

CONCLUSION AND RECOMMENDATIONS

The focus of this research is the importance of Standard Method of Measurement which is expected to be introduced and implemented nationwide in Indonesia. The findings show that there are at least 13 (thirteen) direct benefits and 3 (three) indirect benefits of implementing Standard Method of Measurement in Indonesia. The main benefit is to provide a foundation for measurement principles in the construction industry. This research has also identified 10 (ten) challenges in implementing this standard method. Solutions are provided for each challenge which essentially seek to promote the benefits and

usage of Standard Method of Measurement in Indonesia. Since developing and implementing standard method has never been done before in Indonesia, further researches must be conducted on the effect of implementing Standard Method of Measurement in Indonesia and the necessity of developing various Standard Methods of Measurement i.e. for building works, for civil engineering works, and for mechanical-electrical-plumbing works.

Declaration of Conflicting Interests

No conflicts of interest are present.

REFERENCES

- [1] V. R. Perumal and A. H. A. Bakar, "The needs for standardization of document towards an efficient communication in the construction industry," *Acta Technica Corviniensis-Bulletin of Engineering*, vol. 4, no. 1, p. 23, 2011.
- [2] G. Nani, P. J. Edwards, T. Adjei-Kumi, E. Badu and P. Amoah, "Customisation and desirable characteristics of a standard method of measurement for building works in Ghana," *The Australian Journal of Construction Economics and Building*, vol. 8, no. 2, pp. 30-40, 2008.
- [3] G. Nani, A. Mills and T. Adjei-Kumi, "Misconception about the use of the standard method of measurement in developing countries: a Ghanaian perspective," In *Past, Present and Future: Inaugural Construction Management and Economics Conference*, pp. 1175-1182, 2007.
- [4] W. P. Utama, M. Peli and D. Y. Jumas, "Standardisasi Pengukuran Kuantitas Pekerjaan Konstruksi di Indonesia: Suatu Gagasan," http://ftsp.bunghatta.ac.id/artikel-1-standardisasi_pengukuran_kuantitas_pekerjaan_konstruksi_di_indonesia__suatu_gagasan.html, 2008.
- [5] H. B. Goh and L. Chu, "Developing national standards for the classification of construction information in Singapore," Presented in *International Council for Research and Innovation in Building and Construction CIB w78 Conference*, 2002.
- [6] J. Molloy, "Civil engineering measurement claims in Hong Kong," *Strategic Integration of Surveying Services*, FIG Working Week, pp. 13-17, 2007.
- [7] C. Jae-Ho, C. Woo-Chul, S. Hyung-Wook, T. Seung-Won, L. Jea-Sauk and C. Jae-Youl, "Practical standard methods of measurement cost estimating in the design stage," *Building Resilience*, p. 95, 2008.
- [8] A. R. N. Akbar, M. F. Mohammad, M. Maisyam and E. W. W. Hong, "Desirable characteristics of Malaysian standard method of measurements (mysmms) in meeting industry quality standards," *ASEAN-Turkey ASLI (Annual Serial Landmark International) Conference on Quality of Life 2014, ABRA International Conference on Quality of Life, AQoL2014*, pp. 26-28, Istanbul, Turkey, 2014.
- [9] A. R. N. Akbar, M. F. Mohammad, N. Ahmad and M. Maisyam, "Adopting standardization in construction environment: standard method of measurement (SMMs)," *Procedia Social and Behavioral Sciences*, vol. 170, pp. 37-48, 2014.
- [10] S. Hansen, *Manajemen Kontrak Konstruksi: Pedoman Praktis dalam Mengelola Proyek Konstruksi*. Jakarta: PT. Gramedia Pustaka Utama, 2015.
- [11] L. P. Esteves, "Recommended method for measurement of absorbency of superabsorbent polymers in cement-based materials." *Materials and Structures*, vol. 48, no. 8, pp.2397-2401, 2015.

— This article does not have any appendix. —