APPLICATION OF MANUAL MATERIAL HANDLING IN TRADITIONAL TILE PRODUCTION PROCESS

Hasbi[1)], Elviana [2)], Pradana Setialana [3)] and Retyana Wahrini[4)]

[1)] Yogyakarta State University
hasbisingkerru@uny.ac.id
[2)] Yogyakarta State University
margarethaelviana27@uny.ac.id
[3)] Yogyakarta State University
pradana.setialana@uny.ac.id
[4)] Makassar State University
retyana.wahrini@unm.ac.id

ABSTRACT

In its current development, the tile industry is experiencing several obstacles. These obstacles are related to production factors that affect the smooth running of the production process. One of the production processes in tile making is the molding and drying process. The problem that occurs is that there are complaints from tile craftsmen, this complaint is based on the fatigue received by workers during the printing process and the drying process which is done directly by the craftsmen. The objectives of the research to be carried out are to: 1) Describe the understanding of tile craftsmen in the operation of Material Manual Handling; 2) Describe the tile craftsmen's understanding of the use of media in operating Material Manual Handling; 3) Analyze the tile craftsmen's understanding of the mastery of Material Manual Handling material. The population used is the roof tile business community in Godean District, Sidorejo Village, Godean District, Sleman Regency, Special Region of Yogyakarta. This research is a study that uses quantitative data analysis techniques with descriptive statistics, namely statistics used to analyze data by describing the data that has been collected. The results showed a positive relationship between (1) understanding of tile craftsmen in the operation of Material Manual Handling; (2) Understanding of media use; and (3) Understanding the use of guides in operating manual material handling. The competency competencies that have been analyzed in this study were obtained from questionnaires distributed to tile craftsmen.

Keywords: *material manual handling, tile craftsmen, production*

1. INTRODUCTION

Implementation of development in Indonesia has succeeded in changing the structure of the economy drastically. One of the important aspects in transforming the structure of the Indonesian economy is the role of the industrial sector (Salam: 2019). The industrial sector is the main sector in the Indonesian economy. The industrial sector is the largest contributor to the formation of Indonesia's GDP, including small industries in rural areas. Small industries in rural areas are known as an additional source of family income and also as a support for agricultural activities which are the main livelihood of most rural communities (Levi:2017). Rural industry has an important meaning in efforts to reduce poverty levels in rural areas or in other words it is expected to improve the welfare of rural communities. Small industries clearly need attention because they not only provide income for the majority of the work force, but are also the spearhead in efforts to eradicate poverty, unemployment and equalize income. The type of industry in each region is different, this is influenced by the different characteristics of the resources owned by each region. Small industry to build rural economy is by industry with local resources and local consumption.

The important role of small industries in the economy needs to be given special attention, attention to developing small and household industries. Small and medium enterprises (SMEs) have a very important role, from a macroeconomic perspective. The role of SMEs is as the main source of employment and income. The role of small businesses can increase individual income in general and local communities in particular. The existence of small and medium industries in Godean District also has a role in providing business fields for the community. So that the role of small industries in Godean District is very useful for the community to be a source of livelihood.

Sokka SBD is a privately owned business engaged in the production of roof tiles for housing located in Godean District. The use of roof tiles as a type of roof covering for buildings is very much in demand, especially in the Java area, besides the installation process is relatively easy, the models and types also vary. Choosing the right type and tile material as a roof covering for a building can give an artistic impression to the building and comfort for the occupants inside (Jalil:2018). The existence of Sokka SBD as one of the SMEs in Godean District makes a good contribution to Godean District as an economic development area in the western part of Sleman Regency based on small industries which is one of the areas where the majority of the population earns a living as tile craftsmen. Running a tile industry business has become part of the life of the people in Godean District so that currently Godean District has become a center for the tile industry which produces several types of roof tiles, both for self-consumption and for marketing.

The roof tile industry is an industry that produces roof tiles, done by hand or with the help of tools/press machines with raw materials in the form of clay and tile making expertise is a community potential that must be developed. As an industry that relies on the availability of raw materials from nature, tile entrepreneurs need to participate in protecting the environment so that the availability of raw materials in nature is maintained. In its current development, the tile industry is experiencing several obstacles. Based on the results of interviews with craftsmen, these obstacles are related to production factors that affect the smooth running of the production process. One of the production processes in tile making is the molding and drying process. The problem that occurs is the existence of complaints from tile craftsmen, this complaint is based on the fatigue received by workers during the printing process and the drying process which is done directly by the craftsmen. In the printing process, apart from printing the tiles, the craftsmen also have to move the tiles to the tile rack. Transfer of tiles is done by carrying the tiles one by one after the tiles are printed on a pressing machine that is operated manually. While in the drying process, tile removal is also carried out conventionally, namely by carrying the tiles one by one using a cart from the rack to the drying area which is placed directly on the ground with an area of ± 15 m2. Another obstacle in the drying process is that when it rains, the roof tiles that are drying on the ground must be removed immediately so that they are not exposed to rainwater, if one of the tiles is exposed to rainwater it cannot be reused, causing losses for tile craftsmen. The process of lifting tiles from the drying area is also carried out by taking one tile at a time from the drying area to the cart and transporting them to the storage rack, so that the duration needed to lift the tiles from the drying rack to the storage room takes quite a long time resulting in many tiles failing to produce. exposed to rain.

The role of SMEs in supporting regional development is very large. For this reason, the empowerment of SMEs including tile makers must continue to be carried out, namely by applying technology (material technology), both process technology and product design, so that it can increase its quantity, quality and competitiveness. The process technology used by small tile manufacturing industries (craftsmen) is still conventional from generation to generation so it has decreased so that it is unable to compete, especially with similar products produced by industries from outside the region that already use modern technology. Seeing some of these problems, the researcher is interested in conducting research with the title "Application of Manual Material Handling in Traditional Tile Production Process"

Hari (2017) explained that Manual Material Handling (MMH) is an activity that is carried out every day by humans. The use of human power in various activities that are carried out manually is still very dominant. We often see work related to MMH in carpentry, loading and unloading of goods, market activities and other business activities. MMH activities include the process of lifting, pushing, carrying, carrying, pulling and other material handling activities without mechanical assistance. Manual handling is defined as work related to lifting, lowering, pushing, pulling, holding, carrying or moving loads with one hand or both hands and/or with the handling of all materials. Manual handling work can cause stress on the physical condition of workers such as exertion, forced posture and repetitive movements which can result in injury, wasted energy and inefficient working time (Tarwaka: 2010). Manual Material Handling (MMH) is an activity of moving goods or objects in a production process that still uses human power. Manual handling can also be interpreted as transportation carried out by workers, in which case workers carry out activities such as lifting, pushing, pulling, transporting and moving goods (Wignjosoebroto, 1995). Meanwhile, according to Suhardi (2018) Manual material handling or manual handling is a moving activity carried out by one or more workers by lifting, lowering, pushing, pulling, transporting and moving goods. Based on some of these definitions, it can be concluded that Material Manual Handling is an activity that includes the activity of moving an object or item when carrying out production in a more concise manner so that work can be facilitated. MMH activities that are often carried out by most workers are as follows is Lifting an object (Lifting Task), Delivery of an object (Caryyng task), Pushing an object (Pushing task) and Pulling an object (Pulling task) (Mark:1993).
The advantage of MMH compared to material handling using tools is the flexibility of the movements performed. However, behind these advantages there are disadvantages, namely in terms of occupational safety and health. MMH activities have the potential for quite large accidents, because in these activities there will be direct contact between the load and the human body. A high load on the muscles and the skeletal system can cause overstrain in the muscles, especially in the neck and spine muscles and in other parts of the body. Besides that, the use of unphysiological or unsafe work postures and large loads can cause backbone injuries to workers. MMH study is essentially to identify and control the causes of injury and minimize the hazard by implementing administrative controls and technical controls. Administrative control applications include hiring selected personnel, training in good material handling techniques and job rotation.

2. RESEARCH METODOLOGY

This research is a correlational descriptive study using a quantitative approach. This research was conducted on tile craftsmen in Godean District, Yogyakarta Special Region. In this study, two methods of data collection were used, namely:
1. Questionnaire Method
The questionnaire method is a data collection technique that is carried out by providing a set of questions or written statements to the respondents to be answered whose assessment principles involve several factors, namely: the content and purpose of the questions, the language used is easy to understand, the questions are open-negative positive, questions are not ambiguous, do not ask things that have been forgotten, questions are not leading, the length of the questions and the order of the questions. Statements in the questionnaire are objective and positive statements, the respondent gives a mark (√) to one of the alternative answers that is considered appropriate to the respondent's situation. This questionnaire was prepared using four alternative answers. Questionnaires were given to tile craftsmen in measuring the use of manual material handling for tile production (Sugiono:2018)
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2. Test Method

Data collection using the Test method was carried out to measure knowledge and attitudes towards the ability to use manual material handling. The questions in the test are in the form of objective and positive statements, the respondent chooses one of the correct alternative answers from the several choices offered.

This research is a study that uses quantitative data analysis techniques with descriptive statistics, namely statistics used to analyze data by describing the data that has been collected. The independent variable and the dependent variable in this study are measured in the form of numbers and then it is described how the understanding of tile craftsmen uses manual material handling.

3. RELATED RESEARCH/LITERATURE REVIEW

The research was conducted by, Levi Martin with the aim of research to find out and analyze the development of tile business carried out by craftsmen and to know and analyze the level of welfare of craftsmen from the perspective of Islamic Economics. The results showed that the development of the tile industry in Pujorahayu Village was influenced by production, raw materials, technology, human and capital resources, and marketing. With several development efforts including increasing access to productive assets, increasing market access and training. With the development of the business, it affects the level of welfare of craftsmen resulting in increased economic income, education, health and housing. However, the development of the tile business has not met the criteria both in terms of creativity and innovation.

Research conducted by, Mufti Hidayat. The purpose of this study was to analyze the manual material handling activities of metal casting operators at CV. Bonjor Jaya. The results of this study are improvements in the design of metal foundry tools with the aim of reducing the level of complaints that are often expressed by metal casting operators. In the use of repair tools for casting, it is possible to change the work method of the operator, who originally used the method of lifting loads to change to pushing the load. Changes in work methods can directly affect work positions that were originally not ergonomic to change to an ergonomic position.

4. RESULTS AND DISCUSSION

In designing this prototype made using the hardware the minimal with Arduino master and a compact power source sourced from solar panels (fig 2). The connected Arduino Uno peer to peer as a data taker from the planted sensor and data from the Arduino Uno sent to the server Arduino master central control of all existing programs.

The research results describe the data obtained from the results of research in the field. The data will be processed using quantitative data analysis techniques with descriptive statistics, namely statistics used to analyze data by describing the data that has been collected. Based on the number of variables and referring to the formulation of the research problem, the data description will include several sections, namely: (1) How do tile craftsmen understand the operation of Material Manual Handling; (2) How do tile craftsmen understand the use of media in operating Material Manual Handling; (3) How do tile craftsmen understand the mastery of the Material Manual Handling guidelines given.

Data on the understanding of tile craftsmen in operating manual material handling in Godean District was obtained by looking at the percentage value of the questionnaire of all tile craftsmen who were sampled.

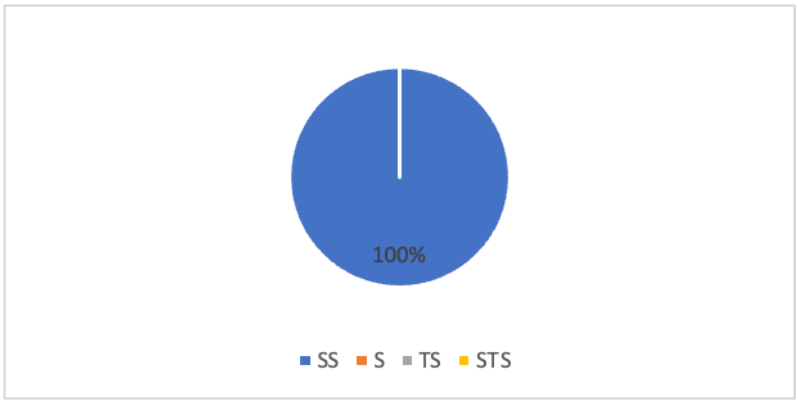

Figure 1. Understanding Analysis of the Operation of Material Manual Handling
Source: Data Analysis Results

Data on tile craftsmen's understanding of the use of media in operating manual material handling was obtained by looking at the percentage values of the questionnaire of all tile craftsmen who were sampled. The following are the results of data analysis based on tile craftsmen's understanding of the use of media in operating manual material handling

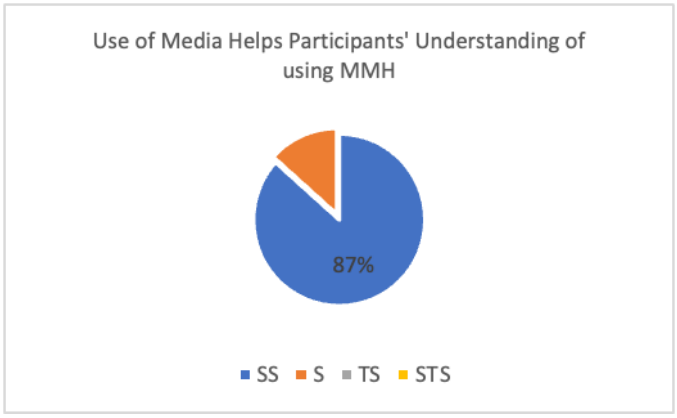

Figure 2. Analysis of Tile Craftsmen's Understanding of the Use of Media in Operating MMH
Source: Data Analysis Results

The data on the tile craftsman's understanding of the mastery of manual handling manual materials was obtained by looking at the percentage values of the questionnaire of all tile craftsmen who were sampled. The following are the results of data analysis based on the tile craftsman's understanding of the mastery of manual handling manual materials obtained through a questionnaire.

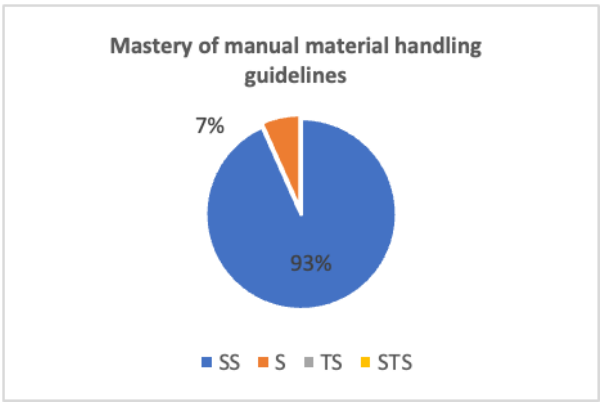

Figure 3. Analysis of Tile Craftsmen's Understanding of The Mastery of The MMH Usage Guide
Source: Data Analysis Results

The results of the analysis show that the understanding of tile craftsmen in the operation of Material Manual Handling obtains 100% in the very agree category. The results of the analysis show that all the sampled craftsmen understand how to operate the MMH provided through training activities. While the results of the analysis of tile craftsmen's understanding of the use of media in operating MMH obtained results in the strongly agree category of 87%, the agree category of 13%. The results of this analysis indicate that tile craftsmen are able to understand the material on how to operate MMH with the help of the media that has been provided. Furthermore, the results of the analysis of tile craftsmen's understanding of the mastery of the MMH guidelines obtained the results of the strongly agree category of 93%, the agree category of 7%. The results of the analysis indicate that the guidelines provided in operating the MMH can be understood by tile craftsmen.
Based on the analysis that has been carried out, it shows a positive relationship between (1) the understanding of tile craftsmen in the operation of Material Manual Handling; (2) Understanding of media use; and (3) Understanding the use of guides in operating MMH. The competency competencies that have been analyzed in this study were obtained from questionnaires distributed to tile craftsmen. The results of this study are also in line with research conducted by Saputra that in carrying out work it is necessary to have better work support facilities to support work activities carried out. In addition, Khairani in his research also revealed that using manual handling tools has advantages because of the flexibility of movements that can be carried out for light loads.
By introducing manual material handling tools, it is hoped that it can speed up the production process of tile craftsmen and can also reduce the risk of spinal injuries that can be experienced by workers when carrying out tile lifting activities. The material handling tools used are tools that have been adapted to human ergonomics so that they are easy and safe to use. This is also in line with research conducted by Karliman that material handling aids can reduce the level of risk of spinal cord injury and speed up the work process. Competence that is absolutely owned by tile craftsmen can be interpreted as an individual ability to do a job that is based on knowledge, skills and attitudes so that it has an important role in supporting tile craftsmen's understanding of using manual material handling.

5. CONCLUSION

Based on the results of the research and discussion, it can be concluded that there is a positive relationship between the understanding of tile craftsmen in the operation of manual material handling, understanding of media use, and understanding of the use of guides in operating manual material handling. By introducing manual material handling tools, it is hoped that it can speed up the production process of tile craftsmen and can also reduce the risk of spinal injuries that can be experienced by workers when carrying out tile lifting activities.

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