

Study on the influence of production facilities and competence toward job satisfaction on foundry industries in West Java, Indonesia

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Abstract. A study on the influence of production facilities and competence toward job satisfaction on foundry industries in West Java, Indonesia has been done. The target of this research is to analyze the influence of production facilities and to job satisfaction that was not as expected yet. The method of research used descriptive analysis of the three variables studied with approximately 100 respondents of the survey result to six foundry industries in West Java Indonesia. The results of this research in a descriptive study showed that the production facilities, the competency and the job satisfaction were fair to good categories. The production facilities had an average value of 3.2943 and standard deviation 0.5452; the competency had an average value of 3.5647 and standard deviation 0.5796; job satisfaction had an average value of 3.2679 and standard deviation 0.5658. The production facilities and competence have influenced employee job satisfaction, the direct and indirect of 27.72% on foundry industries in West Java, Indonesia.

1. Introduction

A free competition which is full of competition and consumer demand for products/services better with the delivery time, has spurred the company of any organization or institution, both private and government to improve its performance. To be successful, they are required to cost-saving efforts, optimize production capacity, increased efficiency and productivity and also improve services [1]. Foundry industry is an industry relied on by capital asset companies, including the manufacturers of those machinery and factory equipment that are needed enormously in various sectors. It can supply the engineering components from agriculture, mining, power plant, communications, construction, industrial, up to transportation. The users spectrum of casting products is such wide that casting stands at a strategic position in a country's structure of industry [2].

To increase the improving of foundry industry productivity, employee performance should necessarily be optimized, because it would in turn increase the performance of the company as a whole [3]. Therefore, so as to improve organizational effectiveness [4] it needs to evaluate the company through the improvement of production facilities, competence and job satisfaction. Production facilities have an influence on employee job satisfaction. This is in accordance with the results of Sonny's research [5] that said the adequate presence of production facilities can produce optimal productivity of casting products that affect employee job satisfaction.

Employee competencies with job satisfaction influence each other as revealed by Wibowo [6] that competency is the ability of a person to produce at a satisfactory level in the workplace, including one's ability to transfer and apply these skills and knowledge in new situations and increase the agreed of benefits [7].

Furthermore Cascio [8], said that the ability and motivation as interactional factors with performance. Ability is determined by skill and knowledge, while skill is influenced by the capability, personality, and knowledge is formed by education, training experience, and interests that are all summarized in competency theory.

As an effort to the development of foundry industry in West Java, Indonesia. It needs to improve the employee job satisfaction requires complete production facilities and high competence of technicians (operators) [9]. Based on the problem mentioned above, the purpose of this research is to analyze how much influence of the production facilities and competence to job satisfaction that was not yet as expected. One of the causes of not jet optimal job satisfaction is suspected to be due to incomplete and out of dated production facilities and the low job satisfaction of employees.

2. Methods

Viewed from its method aspect, the present research was an analysis of primary and secondary data. The primary data was collected for some time of 2019 by survey in six selected foundry industries in West Java, Indonesia. The primary data obtained through survey by conducting research, interviews to selected companies in addition to the hearings with technicians and experts. The secondary data obtained by a literature study, journals, internet browsing, etc.

The object of this research is to determine and analyze the current condition of production facilities, competence and job satisfaction and how much influence of production facilities and competence to job satisfaction. The location foundry industry in West Java, Indonesia. Six companies were selected, namely: W-1, W-2, W-3, W-4, W-5, and W-6 [2, 9]. For the sake of confidentiality of those foundry industries which were selected to be the research object, then, in conformity with ethic code, written here were only the initials of the companies. The assessment of respondents used five (5) levels with score as follows: very good (4.21 - 5.00), good (3.41 - 4.20), fair (2.61 - 3.40), poor (1.81 - 2.60), bad (1.00 - 1.80) [10].

The method of research is as follows: (a) the sampling technique: cluster proportional random sampling [10], (b) sample size > 100 respondents, (c) the method of research using descriptive analysis, (d) the instrument research test: validity, reliability, normality. The steps of research can be seen in figure 1.

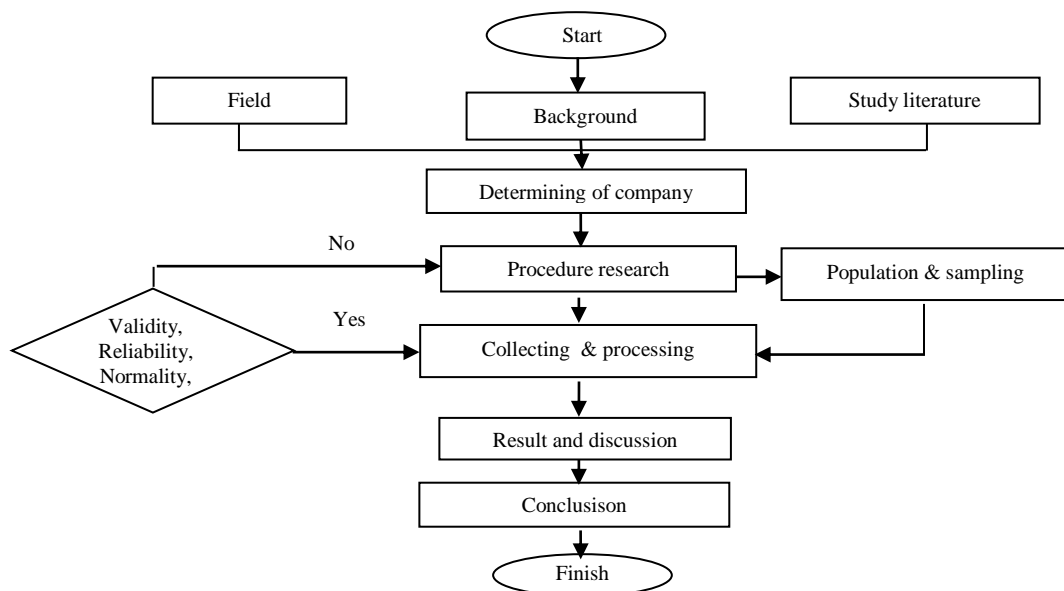
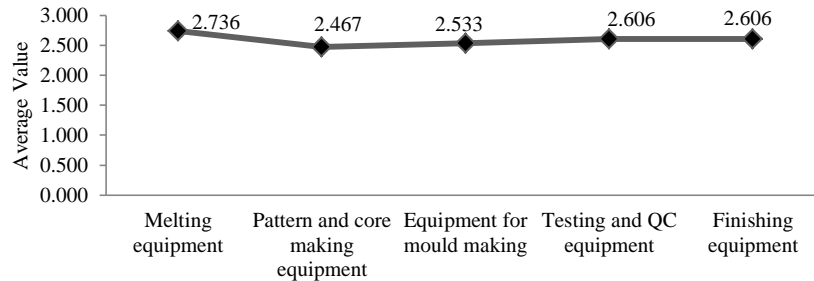


Figure 1. Flow chart of methodologies research.

3. Results and discussion

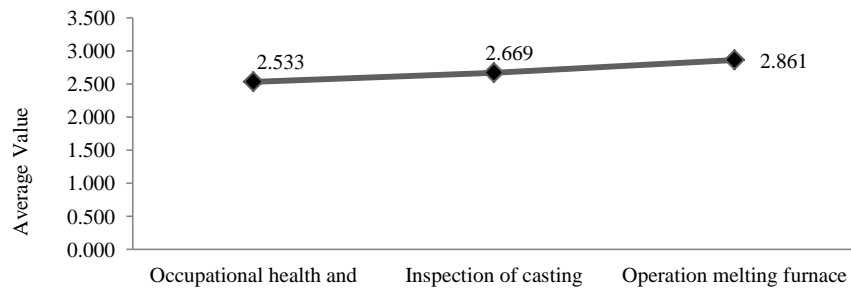
3.1. Foundry industry condition

The conditions of empirical data of six foundry industries selected in West Java, Indonesia, namely: W-1, W-2, W-3, W-4, W-5, and W-6 are shown in figure2, figure 3, and figure 4.



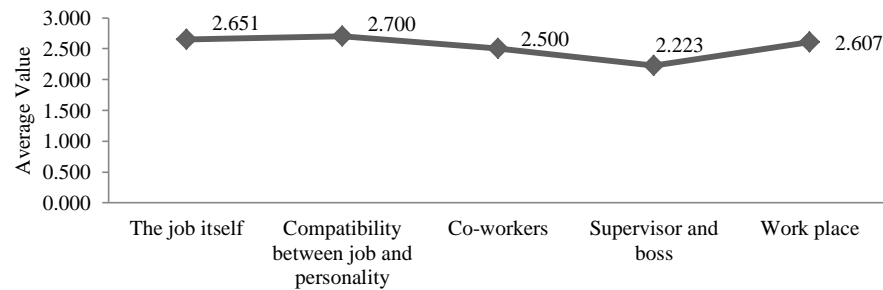
Dimension of the production facilities

Figure 2. The production facilities of six foundry industries in West Java, Indonesia.



Dimension of competence

Figure 3. Competence of six foundry industries in West Java, Indonesia.



Dimension of job satisfaction

Figure 4. The job satisfaction of six foundry industries in West Java, Indonesia.

The description of respondents' characteristics was seen from gender, age, level of education, and year of service of the employees. More details are shown in figure 5 [2, 7, 9].

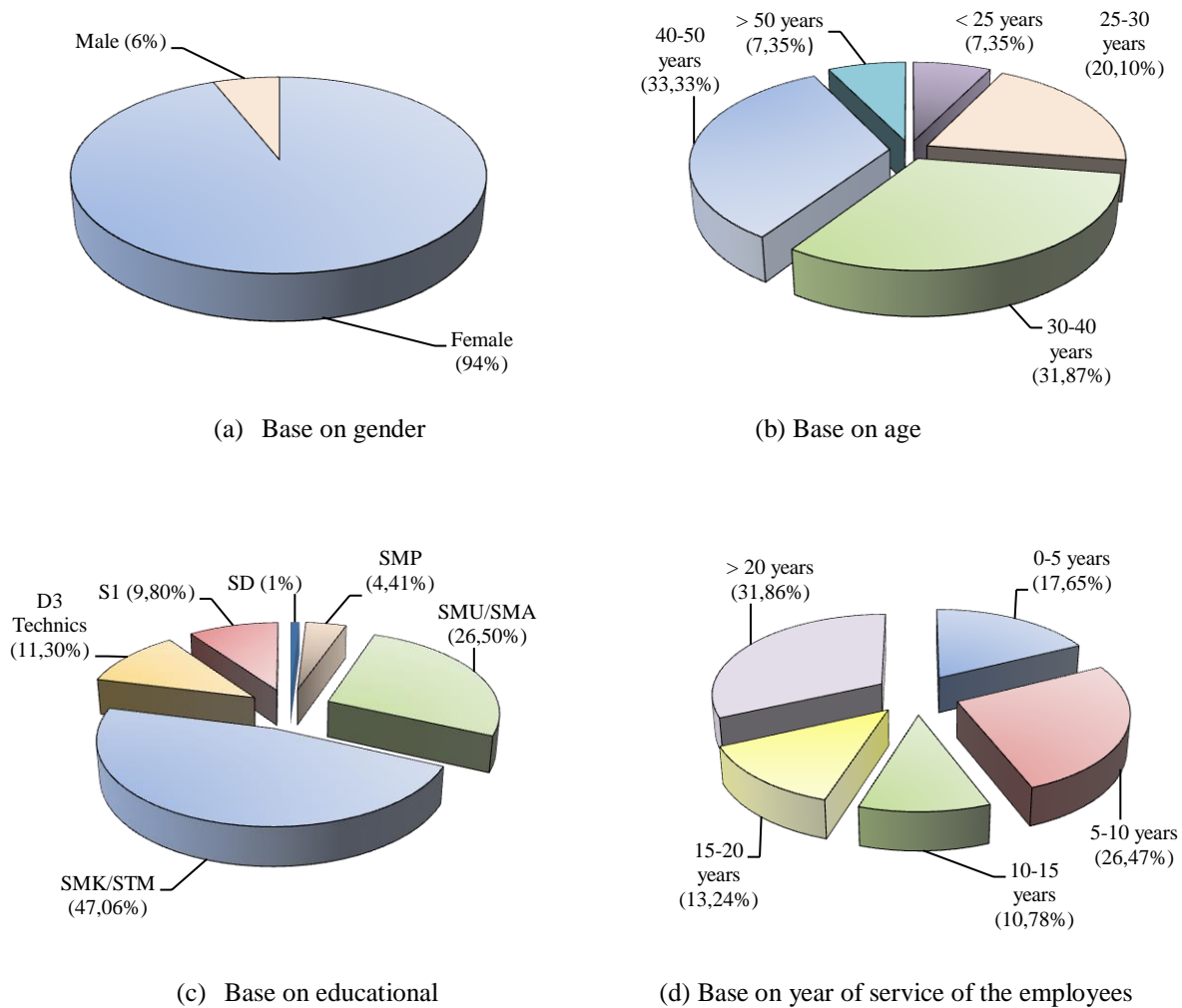


Figure 5. Respondents characteristics.

3.2. The instrument research test

The instrument used in this study was in the form of a questionnaire distributed to respondents with a sample size of approximately 100 employees to six foundry industries in West Java province. The research variables measured:

1. The production facilities, involving five dimensions, namely: melting equipment, pattern and core making equipment, equipment for mould making, testing and quality control equipment, and finishing equipment (5 dimensions).
2. Competence, involving three dimensions, namely: occupational health and safety (OHS), an inspection of casting, and operation melting furnace (3 dimensions).
3. Job satisfaction, involving five dimensions, namely: the job itself, compatibility between job and personality, co-workers, supervisor and boss, and workplace (5 dimensions).

The validity test of the instrument was performed to determine whether or not the data from the result of questionnaire collected was valid for all question, that is [11]:

1. The validity test : all instruments valid (value $r_{computations} \geq r_{table}$ (0,30))
2. The reliability test : all instruments reliable (value $r_{computations} \geq 0,700$)
3. Normality test : all instruments normal(value p-value > 0,05).

3.3. *Production facilities description variable*

The subjects were used to analyze the description of production facilities variable consisted of five dimensions, namely: (1) melting equipment, (2) pattern and core making equipment, (3) equipment for mold making, (4) testing and quality control equipment, (5) finishing equipment. The determination of the dimensions was in conformity with the research characteristics sourced from W-1[12].

The individual assessment of each dimension in production facilities could be categorized from fair up to good. However, if it is integrated into other dimensions, there was a gap between the results shown in the average value of each dimension of the production facilities variable. A quite significant gap occurs in the dimensions of finishing equipment, with the lowest average value of 3.035 and a standard deviation of 0.744. Whereas the highest results were obtained from the dimensions of equipment for mould making, which the highest average value of 3.446 and standard deviation of 0.761.

Based on the analysis result as a whole on the statement of production facilities variable, it could be interpreted that the production facilities variable had an average value of 3.2943 and standard deviation of 0.5452 at an interval scale from 2.749 to 3.839 it's categorized from fair up to good. It indicates that the production facilities in the six foundry industries in West Java has been good.

3.4. *Competence description variable*

The descriptive analysis of the technician competency variable consisted of 3 dimensions: (1) occupational health and safety (OHS), (2) inspection of casting, (3) operation melting furnace. The determination of the dimensions was in conformity with the research characteristics produced from SKKNI BNSP and TUK-LM BBLM [13].

The individual assessments of each dimension in the casting technicians' or casting operators' competency could be categorized from fair up to good. However, when integrated to other dimensions, it was found a gap between the results shown in the average value of each dimension of competence. A quite significant gap occurred in the dimensions of occupational health and safety (OHS), with the lowest average value was 3.550 and the standard deviation of 0.701. Whereas the highest results were obtained from the dimensions of operating melting furnace, which the highest average value is 3.574 and standard deviation of 0.622. It indicates that the K3 in the foundry workplace is very important for employees by following safe work practices, reporting hazards at workplace, following emergency procedures.

Based on the analysis result as a whole on the statement of the casting technician competency variable, it could be interpreted that the competency variable had an average value of 3.5647 and standard deviation of 0.5796 at an interval scale from 2.985 to 4,144 was in category of fair up to good. It indicates that the casting technician competency in the six foundry industries in West Java has been good.

The dimensions of work safety were generally categorized as poor because awareness and discipline regarding the use of safety equipment were still not optimal. For example, companies have facilitated safety equipment (safety shoes, aprons, face shield, helmets, etc.) according to the demands of their respective workplaces but technicians were less accustomed to using them.

3.5. *Job satisfaction description variable*

The descriptive analysis of job satisfaction variable consisted of 5 dimensions: (1) the job itself, (2) compatibility between job and personality, (3) co-workers, (4) supervisor and boss, and (5) working environment. The determination of the dimensions was in conformity with the research characteristic produced from George's and Jones [14] theoretical investigation.

By using the same method which is used by above production facilities and competence descriptive analysis. The calculations results of each dimension in employee's job satisfaction could be categorized from not good to good. However, when integrated to other dimensions, it was found a gap between the results shown in the average value of each dimension of job satisfaction. A Quite significant gap occurred in the dimensions of compatibility between job and personality,

the job it self and co-workers, with the lowest average values of 3.045; 3,080; 3.190 by standard deviation values of 0.735; 0.658; 0.706. Whereas the highest results were obtained from the dimension of supervisor and boss with the highest average value and standard deviation of 3.602 and 0.837, respectively.

Based on the analysis result as a whole on the description of job satisfaction variable, it could be interpreted that job satisfaction variable, falling into a category of fair up to good. It indicated that the employee job satisfaction in the six foundry industries in West Java has been good.

3.6. *The influence of production facilities and competence toward job satisfaction*

After analyzing the research instruments and scaling analysis, the collected data then used to analyze and test the formulation of hypothesis testing based on Structural Equation Modeling (SEM). As a result of SEM for processing data with the Lisrel 8.7, the model as shown in figure 6.

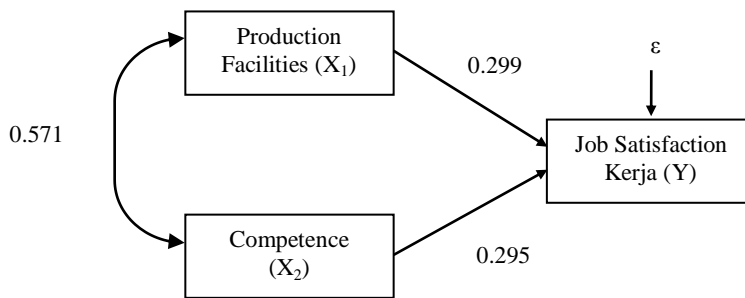


Figure 6. The result of path testing.

where ϵ is the epsilon.

The calculation results obtained indicate job satisfaction is influenced by the production facilities and competencies, both partially and simultaneously. Based on the correlation value and path coefficient obtained from the results of calculations with Lisrel 8.7, it can be seen the magnitude of the direct and indirect influence of the production facilities and competencies toward job satisfaction, shown in table 1.

Table 1. Direct and indirect influence of production facilities and competence toward job satisfaction.

Variables	Direct influence(1)	Indirect influence through		Indirect influence(2)	Total influence(1 + 2)
		Production Facilities	Competence		
Production Facilities	8.94%		5.04%	5.04%	13.98%
Competence	8.70%	5.04%		5.04%	13.74%
Total	17.64%	5.04%	5.04%	10.08%	27.72

Based on the analysis of the data in table 1, it can be seen that the influence of production facilities and competence toward job satisfaction is influenced by direct and indirect influence. The total influence production facilities, competence and job satisfaction is 27.72%. The direct influence of the production facility variable toward job satisfaction was 8.94% and the indirect influence through the competency variable (5.04%) so that the total contribution was 13.98%. While the direct influence of competence variables toward job satisfaction on job satisfaction was 8.70% and the indirect influence through production facilities (5.04%) so that the total contribution was 13.74%.

In addition to the two variables above, there were still many variables that gave influence toward job satisfaction because it was based on influences outside the model, that was 0.723, meaning that job satisfaction was influenced by variables outside the research model of 72.28%.

4. Conclusion

The production facilities in the foundry industries were perceived as varying from fair up to good. The highest average value was for the equipment for mould making. The lowest average value was for the finishing equipment. Competence in the foundry industries was perceived as varying from fair up to good. The highest average value was for the operating melting furnace. The lowest average value was for the occupational health and safety (OHS) in the workplace. The employees' job satisfaction in foundry industries was perceived as varying from fair up to good. The highest average value was for parameter of the supervisor and boss. The lowest average value for the compatibility of between job and personality. Production facilities and competencies have a direct and indirect effect on employee job satisfaction in the casting industry in West Java, Indonesia. The higher of employee's assessment of production facilities and competence, the greater the influence in increasing job satisfaction. The production facilities must be continuously improved to produce casting products that have high value, namely: vacuum induction furnace for melting and moulding machines with automatic working systems as well as testing and quality control equipment, namely: for moulding sand, chemical composition testing and mechanical tests, spectrometer, Scanning Electron Microscopy (SEM)/Energy Dispersive X-Ray Spectroscopy (EDS). Casting technician competencies need to be guided and developed through professional training that has recognized competency certificates. The job satisfaction of foundry technicians needs to be improved through work placement and rotation in accordance with their fields, providing fair remuneration and a good workplace.

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References

- [1] Abdullah H and Harbintoro S 2017 Analysis of Situation and Competitive Strategy Formulation For The Vision and Mission Toward The In Year of 2020 (Case: in MIDC Ministry of Industry Indonesia) *Proc. The 15 th International Conference on QiR (Quality in Research)* (Indonesia: Faculty of Engineering University of Indonesia) p 1041
- [2] Hafid 2015 Analysis of the Workplace Culture 5S for Continuous Improvement on Foundry Industry in Indonesia *Proc. The 14 th International Conference on QiR (Quality in Research)* (Indonesia: Faculty of Engineering University of Indonesia) p 1225-7
- [3] Abdullah H 2016 Analysis of Foundry Technician Competency as an Effort to Improve Company Performance (Case Study: on Ferrous Foundry Industry in West Java *Proc. National Seminar on Industrial Technology 2016* p 5-8
- [4] Wayne R M 2008 *Human Resource Management Tenth* (Jakarta: Erlangga) p 256-7
- [5] Djatnika S S D and Hafid 2008 Iron and Steel Melting in Coreless Induction Electric *Journal of Industrial Research* **2** (2) 76–90
- [6] Wibowo 2010 *Motivation in Management* (Jakarta: Raya Grasindo Persada) p 339
- [7] Abdullah H and Herjanto E 2017 The Effect of Competence Toward Job Satisfaction as an Effort to Develop Human Resources Industry *Proc. PPIS* p 95-9
- [8] Cascio and Wayne F 2003 *Managing Human Resources Sixt* (New York: Mc. Graw Hill) p 117
- [9] Abdullah H 2020 Analysis The Effect of Job Satisfaction Toward Employees Performance as an Effort to Human Resources Foundry Industry Development *Proc. Mechanical,*

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- Infrastructure and Industrial Engineering* p 040002-5.
- [10] Sugiono 2012 *Business Research Methods* (Bandung: Alfabeta) p 121-32
 - [11] Juliansyah N 2014 *Economic and Management Research Data Analysis* (Jakarta: Grasindo Publisher) p25
 - [12] MIDC 2004 *Project on Supporting Industries Development for Casting Technology (MJ-SIDCAST Project)* In The Republic of Indonesiathethe Japan International Cooperation Agency (JICA) and Metal Industries Development Centre (MIDC), Ministry of Industry Bandung p 9
 - [13] MIDC 2014 *Competency Test Place (TUK) Machinery Metal (LM) Metal Industries Development Centre (MIDC)* Ministry of Industry Bandung p 3
 - [14] Jones G 2002 *Understanding and Managing Organizational Behavior* (New Jersey: Prentice Hall International Inc New Jersey) p 22