

Improving Quality and Work Quality at the 2019 World Skills Competition in Industrial Control

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Abstract

This research discusses how to increase value and quality in the field of Industrial Control internationally, the World Skills Competition held once every 2 years and in every odd year, the Indonesian membership has started from 2003 and continues to this day. World ranking competitions such as the World Skills Competition are here to find out the extent to which the competence of the nation is internationally recognized, as well as to represent in the name of the Nation and Indonesia namely Indonesia, Indonesia follows 29 fields of racing from 51 existing racing fields and our company participated in the automation field of "Industrial Control ". That was carried out on 14th to 18th October 2017 at ADNEC, Abu Dabi. Subsequently in September 2019 the plan will be held in Russia. The method used will be a pareto chart with the help of 5M and Fishbone analysis. It is hoped that with this method the results will be increased at the World Skills Competition 2019 in Russia will increase and the target is to win gold for Indonesia. From the aspect of improving the quality of work, things that need to be done are to make continuous improvements to the ability and expertise of participants in the field of industrial control.

Keywords Industrial Control, Pareto Diagram, world skills competition, efficiency

I. INTRODUCTION

The latest developments and technologies are very rapid and have entered the 4.0 industry, therefore if the development of this technology is not followed by the development of competence in the country, then the possibility of the country will experience a setback. Each country wants to develop new energy by creating a rule or regulation and policies that are considered appropriate to make progress in the country itself, especially in the economy. Then the rules and policies taken must be in accordance with the existing conditions. That is to see the potential and capabilities of the country. If potentials and abilities have been developed, it will increase work motivation for the people. Therefore, there needs to be a potential increase and the ability to improve the economic development of the country. Because of the economic development of the country will affect the economy in the region. There are three things to consider in developing the spirit of

the economy, namely developing efficiency, developing Entrepreneurship Motivation, and granting Property Rights. Developing efficiency. Every person or individual must have the competence. If one's competence continues to be trained and developed, competence will be better. Competence means a person's ability, talent, knowledge or expertise to do something.

Growing Motivation is an encouragement that one can not wait to take action to achieve the desired goal. If one knows the competence they have, then there will be one's spirit to improve their ability to produce something better. Because each individual is motivated to achieve satisfaction, want to achieve, and always want to move forward.

Property Rights Efficiency growth must be accompanied by the provision of Property Rights. Property rights means rules, ethics, law enforcement and culture. If a rule has been made, the competence can be generated then there will be motivation so that it can foster a new spirit. Everything done must be adapted to written and unwritten rules. Inter-state cooperation will require ownership rights to bring about inter-state peace. To build the country's economy needs to be regulated in all respects. Both economic, political, social and cultural aspects. With the aim of gaining and improving the efficiency and motivation in the country.

II. LITERATURE REVIEW

Industrial Assistance Proficiency includes elements of electrical installation and installation of automation [1]. However, at this time he was more inclined to install automation. There are various technical skills needed compared to competitors, including the installation of channels, cables, equipment, equipment and control centers. Competitors also need to form a circuit and create programs in the Programmable Logic Guard (PLC), bas system parameters and Human Machine (HMI) configurations [2] Competitor's main skills are solving problems, knowing the right problems during installation or controlling the problems in work that have been made and also the form of the service period. Participants will work in various industry settings, he may have specific knowledge about a particular industry or may work more generally. Participants will work on 1 (one) project as a whole, install and arrange expenditure equipment, or may work

for subcontractors which include several industry estimates [3]. Practitioners need awareness about the implications, both financial and commercial reputation, which are excessive due to issues of trust in the expenditure sector. Therefore, they need to work logically and follow the period given. Work environment is a dangerous place. Therefore, practitioners need to be proactive to show their best work and also always maintain the health and work environment so that they are always safe and obey the rules of health and safety.

World skills matches take place every two years and are the largest vocational education and proficiency event in the world that truly reflects the global industry [4]. Competitors represent the best countries of their peers and are selected from state competition in their respective countries[5]. They demonstrate technical skills individually and collectively to carry out certain tasks that they learn and / or run in their workplaces [6].

World Skills is a global center for development skills and skill up [7]. Through cooperation and development between industries, country, organizations and institutions [8]. The need for quality control arises after the industrial revolution, where the process of spending run by the machine raises two main problems, a) The use of the engine originally replaced the position of human power, b) Expenditures of goods are carried out on a large scale so that they require uniformity of components in the installation process where it is only allowed by the machine.

In order for the expenditure process to run smoothly, it takes workers to arrange items that are under the standard quality, so that at that time the quality control business is known [9]. However, the development of a more advanced industrial mechanization system has caused the industry to become irregular, so that producers become less concerned about producing high-quality goods. Therefore, there is a belief that employees who carry out supervision are a barrier for workers and supervisors to be able to carry out production activities [10]. But with the development of information and communication, the situation has begun to change where the importance of quality control is increasingly required so that quality control procedures and procedures are first developed towards the better

The purpose of quality control is to make the final product produced according to product specifications and standard sets [11]. In addition there are several objectives for quality control, namely: (1) To improve the uncontrolled process, (2) To control the finished product, in this case it is done by taking the sample of the receipt, (3) To produce quality products, (4) Work for inspection or inspection cost to minimize, (5) strives to reduce the cost of product design and processes using certain production quality, and (6)

Make sure the cost of production is minimized as low as possible [12]. Given the achievement of the aforementioned goals means that there is an improvement in the quality of the final product, the continuous quality control of the production process so that action can be taken if an unexpected change occurs [13].

Understanding quality contains many definitions and meanings, depending on purpose and usage[14]. For some of the widely used quality features, among others : (a) Quality is compliance with requirements or claims, (b) Quality is a match with use, (c) Quality is continuous improvement and improvement. (d) Quality is an effort to meet the needs of consumers from the beginning and at all times,5. Quality is an attempt to do so from the beginning, (e) Quality is something that can satisfy the user [15]. Quality can generally be interpreted as a measure of quantity that indicates the stage of the good of a product, or can be interpreted as the best condition within certain limits in accordance with the will of the consumer. In general, the conditions required by consumers as the most important are product prices and product benefits. The two things are related: a. Specification of operating characteristics, b. Product age and reliability, c. Manufacture of rice, d. The condition in which the product is made, e. Installation and maintenance of products and facilities in the field [16].

The characteristics of the product desired by consumers can generally be the state and the beauty of the form of the product [17]. So briefly the quality can be defined as satisfaction in the use of products that include aspects of: Product quality: The quality of the product or service Cost quality: Quality of cost, Delivery quality: Quality delivery products, Safety quality: Safety quality, utility of spirit: Quality in serving customers [18].

Based on the above qualities of understanding, the determinants of product quality characteristics are consumers, so even if the producers have produced products that are considered appropriate to achieve the intended goal, but consumers who value the benefits and qualities of the product [19]. So in designing, producing and selling the product of the party's products should be oriented to the interests of consumers. Basically quality control activities have a very wide scope, because all aspects that affect quality should be noted [20]. By line big, quality escort can be differentiated into three levels namely escort pre-process quality, quality escort during the process and quality control of the product produced. As such it will be deductible for deviations that may apply .

The purpose of describing the problem in a diagram or picture is to make it easier for us to understand the picture of the problem and the factors that cause problems in a chart or picture. stated, in the

literature on operations management, casual maps were identified by several names including Ishikawa (Fishbone) diagrams, impacts wheels, issues trees, strategy maps, risk assessment mapping tools (FMEA), and cause and effect diagrams. Fishbone Diagrams is a causal analysis that was awakened by Kaoru Ishikawa who described the problem and its cause in a fish bone skeleton [21]. Impacts Wheels is a simple structured conversation approach designed to help administrators explore the consequences of special events and to identify the consequences. Issues Trees are approaches that help determine a problem in the main cause components in order to realize a project work plan. Strategy Maps is a cause mapping tool to awaken and convey strategies [22]. Risk Assessment Mapping Tools are used to provide a systematic method to know for sure all types of potential failures, potential causes, and consequences. Cause and effect Diagrams a cause mapping tool to improve quality and build roles in quality management programs. Furthermore, Scarvada said casual maps may be useful tools. These benefits include the following: (a) Diagnosis tool - casual map can help users to know for certain and solve problems, (b) Communication tool - casual map can communicate cause and effect relationships effectively and impressively, (c) Risk-reduction tools - a causal map can help in anticipation of undesirable effects and reduce risk, (d) Controls - a causal map can help identify the best location to control [23].

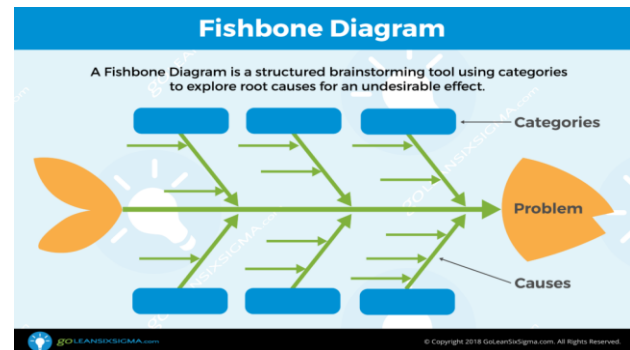
Fishbone diagram is a visual tool for identifying, exploring, and visualizing in detail all the reasons related to the problem. The basic concept of fish bone diagrams is the basic problem placed on the right side of the diagram or on the head of the fish bone [17]. The cause of the problem is illustrated on fins and thorns. The causes of the problem categories that are often used as early start include materials (raw materials), machinery and equipment (machinery and equipment), manpower (human resources), method (method), Nature / environment (environment). Six causes of this problem are often abbreviated 6M. Causes of other problems other than 6M may be selected if necessary [24]. To find the cause of the problem, both from 6M as described above and other possible reasons brainstorming techniques'

This fish bone diagram is usually used at the stage of identifying the problem and determining the cause of the problem. In addition to identifying problems and determining the cause, this fish bone diagram can also be used in the process of change. Fishbone Diagram can be used to analyze problems at individual, team and organization levels. There are many uses or benefits of using this Fishbone Diagram in problem analysis [18]. Benefits of using fish bone diagrams include: (a) Focusing on individuals, teams, or organizations on key issues. The use of Fishbone Diagrams in teams / organizations to analyze problems will help team members focus on issues of priority

issues, (b) Make it easy to describe a brief overview of troop / organization issues. The Fishbone Diagram can illustrate the main problem briefly so that the team easily catches the main problem, (c) Make an agreement on the cause of the problem. By using brainstorming techniques, team members will give suggestions on the cause of the problem[20]. These various proposals will be discussed to determine which of these reasons relates to major issues including determining dominant reason, (d) Build support from team members to produce solutions. After determining the cause of the problem, the steps to produce the solution will be easier to get support from team members, (e) Stacks of troops on the cause of the problem [24]. The Fishbone Diagram will allow troop members to cause problems. It can also be further developed from any established cause, (f) Facilitate to visualize the relationship between cause and problem.

The steps in the supply of Fishbone Diagram may be explained as the following :

1. Create a Fishbone Diagram framework. The framework of the Fishbone Diagram including the fish head is placed to the right of the tattoo. This fish head will then be used to express the main problem. The second part is the fin, which will be used to write groups that cause problems. The third part is the thorn that will be used to indicate the cause of the problem. The framework of the Fish Diagram may be described



Picture 1 Fishbone Diagram

2. Formulate the main problem. The problem is the difference between the circumstances that exist and the circumstances desired. Problems can also be defined as gaps or gaps between achievements during and achievements targeted. This main problem will be placed to the right of the Fishbone or placed on the fish's head. The following is an example of the main problem formulation. (a) Problems with training institutions Quality education and qualified graduates. Low quality training for trainees, and others, (b) Problems with the Bank, Long turn at the cashier or customer service. Bad credit stage, and others, (c) Customs Officer Not achieving the excise target. Low quality of cultivation, and others

3. The next step is to look for the main factors that influence or cause problems. This step can be done with brainstorming techniques, problems can be collected in six collections namely materials (raw materials), machines and equipment (machinery and equipment), manpower (human resources), methods (methods), Mother Nature / environment (environment), and measurement . Gaspers and Fontana (2011) classify problems into seven aspects, namely manpower (HR), machines (machines and equipment), methods (materials), materials (raw materials), media, motivation (motivation), and money (financial). The collection that causes this problem is placed on the Fishbone diagram.

4. Look for reasons for each group that causes problems. This stem is placed on the fish spines. The following are examples of the causes of low quality gradations of education and training programs. (a) HR collection : For example HR issues related to teaching staff. The reason for this element of teaching is the low power of teaching. There are several teachers who are not in accordance with their fields, (b) Material Collection. Regarding education and training, the causes of unfavorable raw materials are poor curriculum quality. Second, a lot of teaching materials are less packed now with organizational development. Third, there are no learning plans in the form of teaching programs and Learning Events Units, (c) Collection of machinery and equipment. There were three key issues in terms of machinery and equipment, namely lack of comfort in the occupied room, lack of space for training, and many damaged computers and projectors, (d) Collection of methods.

III. METHODOLOGY

World Skills Competitions

Every two years World Skills hosts the world championships of skills which attracts more than 1,300 Competitors from more than 70 countries. At this event, young people from all corners of the globe gather together for the chance to win a prestigious medal in their chosen skill. There are competitions in over fifty skills across a wide range of industries — from joinery to floristry; hairdressing to electronics; and auto body repair to bakery. The Competitors represent the best of their peers and are selected from skills competitions that are held in World Skills Member countries and regions. One of the legacies of World Skills Competitions is the increased visibility of skilled professional education, as one of the tools of social and economic transformation.

The Competition also provides leaders in industry, government, and education with the opportunity to exchange information and best practices regarding industry and professional education. New ideas and processes inspire school-aged youth to dedicate

themselves to technical and technological careers and build a better future.

World Skills Competitions are the gold standard of skills excellence. They inspire young Competitors to reach new heights, helping them turn their passion into a profession.

IV. RESULT AND DISCUSSION

The Decision of Industrial Control in Abu Dhabi

A. Achievement Score Table

From the results of the schedule above, it represents the overall picture of the standardization factor in this competition, this shows that there is a gap or difference between the maximum score that must be achieved by the participant and the achievement of the value achieved by the participant. This is the assessment material in this match, especially for all components involved including participants, coaches and all interested parties involved in this match.

Table 1 Ranking (700 scale)

Member	Result	Award
China	730	Gold
Switzerland	729	Gold
Brazil	728	Gold
Indonesia	725	Medallion for Excellence
Korea	720	Medallion for Excellence
Portugal	713	Medallion for Excellence
Japan	709	Medallion for Excellence
Vietnam	705	Medallion for Excellence
Chinese Taipei	704	Medallion for Excellence
Sweden	701	Medallion for Excellence
Austria	700	Medallion for Excellence
Germany		-
France		-
Finland		-
Canada		-
Russia		-
Iran		-
Singapore		-
New Zealand		-
Ireland		-

From the schedule above it can be seen that the Indonesian contingent is in fourth position with a score of 725, which means that the Indonesian contingent shows maximum and very good results. These results also show that the Indonesian contingent has excellent skills in industrial control, and can compete with competitors from other countries in the world.

Identification of the root cause of the problem with "5W", 5 Why (5W) is a method to explore the causes of a deeper problem systematically to find a deeper way of coping. The following is an example of the application of 5W as shown in the table :

No	Criteria	Score		
		Max Point	Result WSC2017	Gap
1	A. Circuit Design	10	8.20	1.80
2	B. Fault Finding	10	10	0
3	C. Measurement	15	12	3
4	D. Installation Panel	30	23.05	6.95
5	E. Test and Commissioning	5	5	0
6	F. Manual	10	2.40	7.60
7	G. Auto	20	0.6	19.40
Total		100	61.25	38.75

Table 2 Result gap skill score results

5 M Faktor	Problem	Why#1	Why#2	Why#3	Why#4	Why#5	Counter Measure
Man	The auto program is not resolved	the process of making a screen HMI is longer than the target that has been made so that the programming time is reduced	the HMI screen is very different from the grid provided	The chief expert gave more HMI changes compared to the previous year	changes in rules for making HMI	orders for making HMI designs unorganized	make a standard time to make the HMI screen with many screen changes
	the project time is not finished in 16 hours	do the work of setting several parts over and over again	some parts come during the competition	there is a delay part from host country	there is a delay in the delivery of work parts	no spare time in preparing work settings	before the competition takes place competitors must ensure what items do not yet exist so that they can determine the steps when installing parts (no part reset settings occur)
Material	Time for installing old pipe clamps	clamp pipe installation is difficult	the size of the clamp with the pipe is very tight so it must be forced	Pipe clamps are different from those in the infrastructure list	parts arrive late so you have to use a local clamp	the absence of clamb size is in accordance with the specifications	practice using clamp pipes with different types
	when the wiring process at I/O LINK is a little inconvenient	it's difficult when entering the cable to the I/O LINK terminal	the cable used is 0.5, when the exercise is used 0.25 according to the infrastructure list	rights of host country	late selection of adequate cable material specifications	there is no appropriate cable material size	when the competition expert must clear what material is used
	the cabling process takes a long time	the treatment of several cables is different	there are new rules for cables that are left not to be cut but must be provided with cable slings	during training there is no installation process of the sleeve	don't know the rules for installing sleeves	absence of standardization in the technique of installing sleeves	training by using the new rules each remaining cable must be provided with sleeves

Table 3 The 5 W Analysis

Machine	the process of punching the wall duct often breaks	punching using 10 drill bits (blunt step drill)	not carrying a small hole saw	new rules that duct holes must match the size of the cable	selection of punching techniques that do not fit the size	absence of standardization of the duct punching process	looking for special tools to punch holes in the wall duct with the size of the cable
Method	programming doesn't get a value	when finish MCB is all OFF right	commands from experts that keep all MCBs off	the assessment of programming is only Q1 which is ON, while the expert command of all MCBs must be	valuation methods that are still not standardized	the process of selecting the MCB operating technique method is not according to the standard	The expert must really detail the rules and be notified to the compet

				turned off			itor clearly
Measurement	minus 1.25 in the measurement value	error in the calibration process	standardization rules for changing SOPs	the existence of SOP rules in the assessment	not yet standardized SOP measurements	occurrence of errors in measurement automation	minimize measurement errors
	NG at 5 point leveling	when assembling components use low tolerance digital leveling	the application of the assembling process is still manual	the application of digitalisasi rules in the assembling process	the absence of clear rules in the assembling process	non-standardized assembling process	make zero defects in the assembling processes

V. CONCLUSION

The result of this journal discusses how to increase the value and quality of competition in the field of International Industrial Competition, the World Expertise Skill held every 2 years and odd years, Indonesia's participation has begun from 2003. World Competitions such as the World Skills Competition to find out when the competence of the children of the nation at the international level, and the names of the State and State names namely Indonesia, Indonesia. 29 lessons from 51 existing competition fields and our companies take part in automation, namely "Control Industry". From the results of the study, the findings reveal that there is the context and the maximum value that participants and participants should use. is 38.75, and the entire contingent of Indonesia is ranked with an overall score of 725. This is what drives the increase using the various methods used, as previously described. Indonesia is in another international contest. This research is also useful for use as a reference material, on behalf of stakeholders to accumulate benefits to enhance skills for participants who will compete internationally.

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