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DEVELOPMENT OF APPLICATION SOFTWARE FOR DEFINING PROFESSIONS WITH 3 LANES ON AN AUTOMOBILE ASSEMBLY INDUSTRY

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Abstract

This paper deals with development of application software for supporting the administration and management of professional trees on an automobile assembly industry. The standard qualifications that are introduced in this paper called the profession with 3 lanes (P3L). Each profession tree is assumed can have 3 lanes that have equality, namely operator/technician lane, utilizer lane, and manager lane.

The lanes are graded equally, similar in difficulty and similar in appreciation. An operator lane is focused on operating of machines/ equipment/ methods/ programs. The main consideration of this lane is at the skill aspects. A utilizer lane is focused at the utilizing of main and supporting equipments. The main consideration of this lane is the analytical aspects. The last, a manager lane is focused at the management of jobs. The main consideration of this lane is at the coordination of finishing the jobs.

The application software has been developed to support the administration of the concept that has been applied on an automobile assembly industry. Basically, the application consists of two main parts that are a database and the user interface. By using this software, the administration and management of all professions as well as their competencies can be done easily.

Keywords: *human resource, standard qualification, profession with 3 lanes*

1. Introduction

In general, each business ran by a certain company will be followed by certain jobs for supporting to reach the business goal. Basically, there are relations among business areas, jobs or activities and profession of human resources (see Fig. 1).

In order the activities at the company can be done effectively (agreed with the target) and efficiently (not wasteful), those activities have to be supported by several supporting equipments which are handled by qualified personnel [1]. In order to evaluate the personnel qualification, basically a standard qualification is needed as a reference. Qualification standards not only can be used to process an evaluation, used also as carrier path guidance. P3L is one of those qualification standards.

2. Basic Concept

In a simple explanation P3L concept is a concept explains that at each profession be assumed consisted of three lanes that are an operator lane, utilizer lane, and manager lane. An operator lane is focused on operating of machines/ equipment/ methods/ programs. The main consideration of this lane is at the skill aspects. A utilizer lane is focused at the utilizing of main and supporting equipments. The main consideration of this lane is the analytical aspect. The last, a manager lane is focused at the management of jobs. The main consideration of this lane is at the coordination of finishing the jobs.

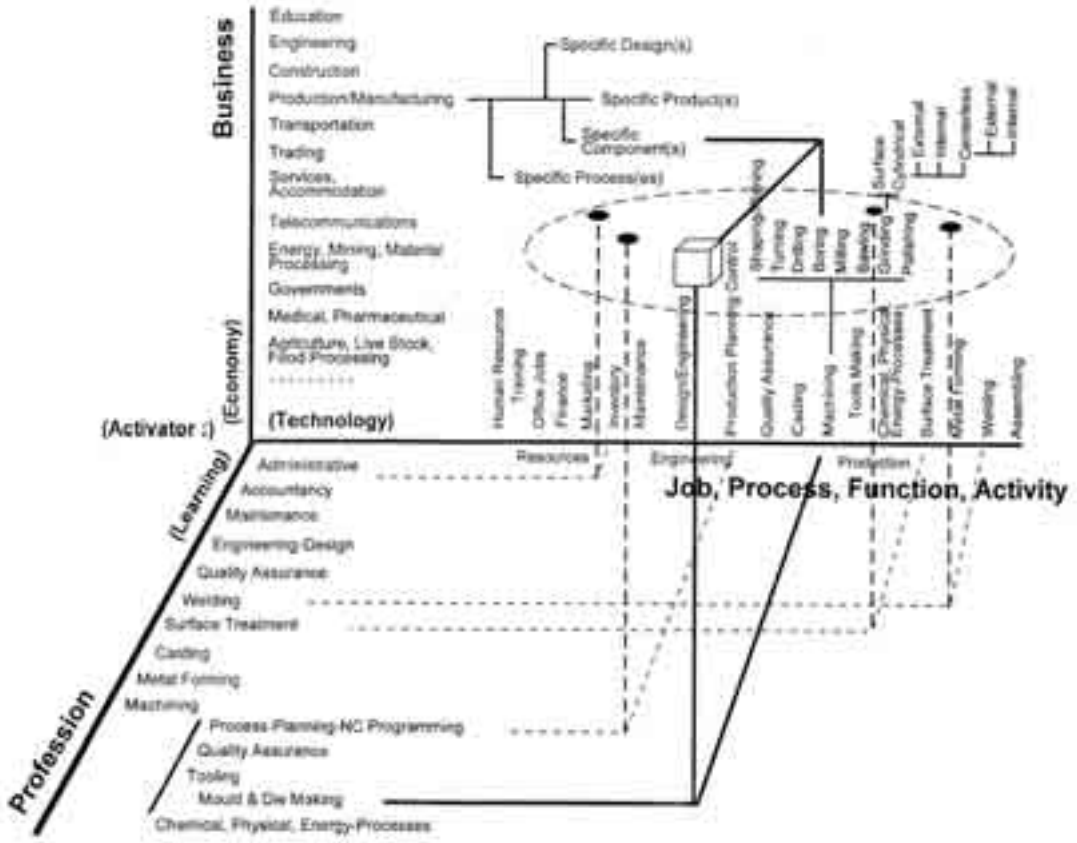

Fig. 1. Relation among business, activity and profession or human resources [1]

As exhibited at Fig. 2, each lane will be divided to the several levels (grades) which are divided to the reasonable age. For each equivalent grade, for example chief manager, chief engineer, and chief technician will have difficulty level and appreciation in equal. The difference is, may be not each lane has the same number of grades. As an example, a managing lane has smaller number of grades compared with an operating lane. The reason is because the starting age to be an operator is relatively younger than to be a manager. The managing lane has a higher prerequisite than an operating lane, so usually the personnel who entrance to the managing lane from the starting are older than personnel who entrance to the operating lane. In the P3L concept, the grading design for each lane is focused on three aspects that are:

1. Knowledge and skill that have seven qualitative grades, those are basic, specific, system, optimization, advance, integration 1, and integration 2.
2. Transfer of knowledge, that is separated into four grades, those are learning, assisting, tutoring, and advising.
3. Assignment and Authority that are separated into four grades, those are operating, supervising, managing, and directing.

Based on the three above-mentioned aspects as a combination, so the difficulty of each equal grade can be defined. As an example, Junior Engineer Grade has the difficulty level as follow:

- Knowledge and Skill: basic,
- Transfer of knowledge: learning,
- Assignment and authority: operating,
- Approximation age: 23–25 years.

In addition to the difficulty aspects, each grade also has several performance references. These references can be used as main criteria to evaluate a properness of personnel to stay on a certain grade. In order that personnel can stay on a certain grade of a certain profession tree, each performance reference should be equipped with proper training materials (see Fig. 3).

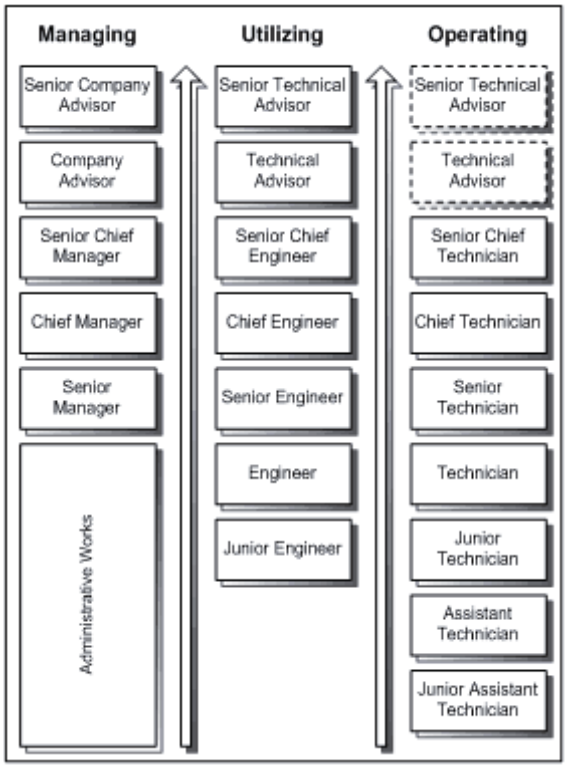

Fig. 2. Profession with 3 Lanes, P3L[2]

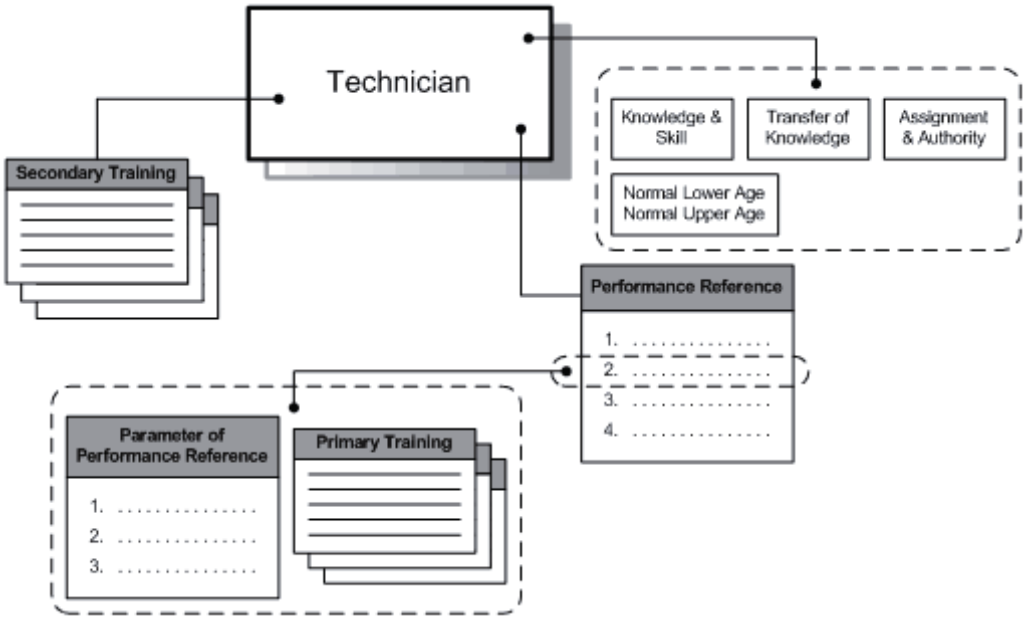

Fig. 3. Profession Grade with Its Attributes

In general, the structural path has pyramid form where the higher positions have smaller number of positions. If personnel will follow their carrier at a structural path, the higher their positions the smaller their changes. Differ with the structural path, at P3L there is the possibility each personnel to reach the top of the profession path that he or she chooses. The pattern that was used at P3L is a matrix one not a pyramid one. This matrix pattern will be fulfilled with personnel in a proper with the company's need. In addition, P3L also uses a paradigm where only view of personnel is positioned at the structural path and the others are positioned at existing several profession trees. The other paradigm is how to handle the job if there are appearing some not the routine job, this jobs will be handled by working group or working module.

The implementation of P3L has close relation with development of the information system. Personnel data not only consist of a basic data such as a name, an address, family etc. but also covers data about career history, training history, assignment history and so on. Such data has huge volume and relatively difficult to be handled without any supporting of sufficient information systems. In addition, the usage of information systems also can support the generation a high quality and consistent decision-making result through decision-making process such as searching of functionary candidates, searching of trainees and so on.

3. Implementation Strategy

As explained before, P3L uses a paradigm where only view of personnel is positioned at the structural path and the others are positioned at existing several profession trees. In the manner of that reason, the slim organization and short bureaucracy path can be achieved. In addition, the other paradigm, which also used is to handle the job if there are appearing some not the routine job, this jobs will be handled by working group or working module. If one company directly implements such paradigms when will use P3L concept as its human resource development pattern, the following difficulties will appear:

- personnel from company not usual yet to use a working group and working module strategy to solve the problem. Personnel familiar with usage of the structural organization pattern. It needs time to carry out the change,
- basically, there is no one of the personnel who is not a functionary of the company organization. Even those personnel to be the functionaries of the lowest level in the organization, they must have supervisors, again all supervisors have managers and so on. This situation certainly will form a bureaucracy chain,
- to make an organization to be slimmer certainly can to appear a rejection to the implementation of P3L systems. The main reason is there are personnel that are threatened lose their structural functionaries caused by the implementation of P3L.

In order to solve the above problems, strategy in the implementation of P3L is to uses career path reference generated by P3L concept to be a tool for better and more systematic searching an organization functionary compares with the old pattern. This proposed strategy is shown at Fig. 4. As mentioned before, it was evident that there are correlations among the activities appeared caused by a certain business with an organization and the personnel who carry out those activities (see Fig. 4). Based on this pattern the arranging of the better organization can be carried out [2, 3].

In the proposed pattern, first a business tree that is a structure to show activities happened caused by business chose by company and the goal of that business, has to be arranged. These activities not only on the technical aspect but also have relation with administrative aspects. As an example, an automotive assembly company has several main activities such as vehicle product order management, human resource management, taxes management, in addition of course management of vehicle assembly activities. In order to make the arrangement of activities be simpler, tree form is used, that is started from the company level activities until the lowest level activities such as activities at the workstation. Those activities basically will not change except there are changing in business. The example of business changing at company level is to move from vehicle assembly company to be a farming equipment producing company, at a workstation level is the usage of a new automatic production machine as a replacement of the old one.

After the business tree has been arranged, the next step is arrangement of organization as a strategy to carry out those activities in order to reach the determined goal of the business. Existing activities are grouping and to be assigned to be distributed to all of parts of organization. For a small size, business that has only view activities of course will have simpler organization structure compare with bigger size company that has a huge activity in its business. Based on that pattern, hope fully there is no part of organization is assigned to do the jobs that have no correlation with chose business area.

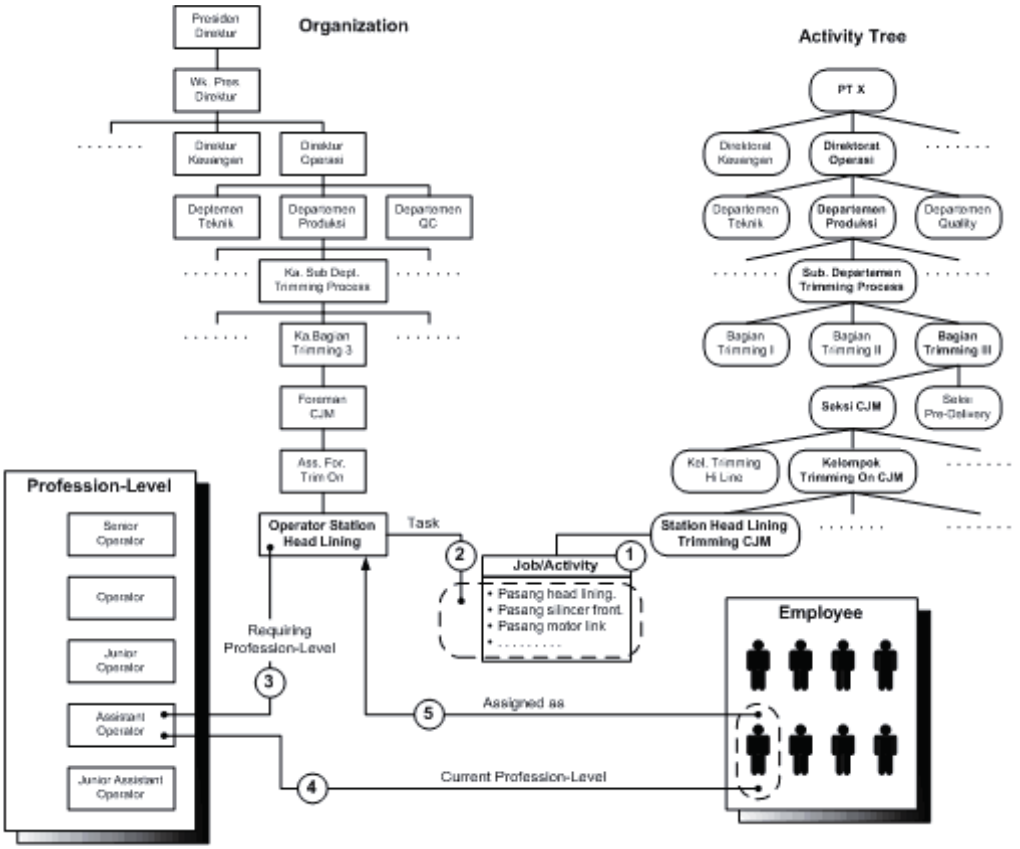

Fig. 4. Proposed strategy in personnel selection for a functionary in an organization

The next step is to determine the grade of profession that is matching to handled those activities with effectively and efficiently. The grade of this profession is taken from P3L career path reference. The act of determining organization's functionary is carried out by personnel searching who has a grade as pre requirement. Somehow, personnel searching maybe give more than one candidate, who complies with a request. In addition, for that condition the other criteria can be used at this searching such as the age, gender, education level and others.

As mentioned before, the conclusion can be drawn that the developed personnel model is more focused to get a personnel that is matching with a certain organization functionary (including the operator to be assigned to a certain workstation). In addition, the personnel model does not have integration with the scheduling system. As a consequent of this reason, the developed model only able to give some personnel names that fulfil with the qualification as a functionary of a certain job. Personnel that will be chose are depending on the decision maker.

4. Personnel Model

In simple form, the developed personnel model to support P3L concept application is shown at Fig. 5. Model for personnel in the developed system is known as a Person Model.

Based on Fig. 5, this personnel model has a main attributes that are personnel identity such as, names, date of birth, blade type etc. In addition, this model also contains the other models such follow:

1. The person's address model represents addresses of the personnel that can be contact.
2. The success memo Model represents successes that ever reached by personnel when their work at company.
3. The family model represents the family of personnel. This model can be used to determine number of families that must be guaranteed by company.
4. The transfer of knowledge model represents knowledge transferring activities that ever made by personnel. This model can be used to know personnel's experiences on knowledge transfer.

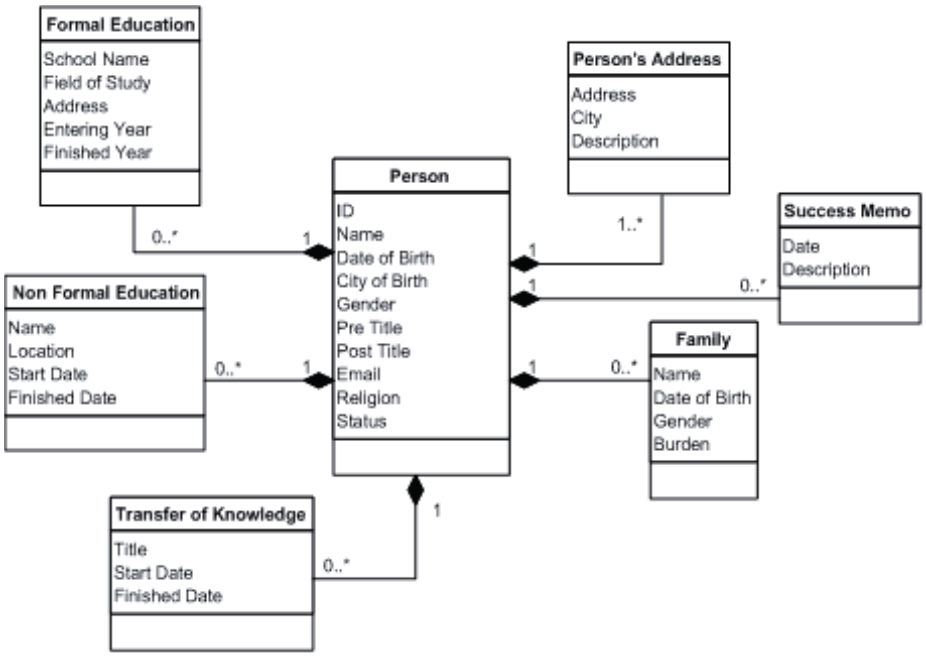

Fig. 5. Propose Personnel Model shown in UML notation

5. The formal and non-formal education model represents the formal education history of personnel such as Elementary School, High school etc. and the non-formal education history such as training or workshop etc.

The relationship between model of personnel and their existing grade is shown at Fig. 6. As shown at Fig. 6, personnel model is connected to the career path model through the grading log model. The grading log model is a career path history representative model of personnel. This model has attributes such as a starting date when the new grade was valid (Date), a finishing date when the old grade was invalid (Until), and remarks about the new grade (Note). By searching for all grades for personnel, the grading history of those personnel will be found. Grade where the personnel recently exist can be found by searching its grading log that has no invalid date.

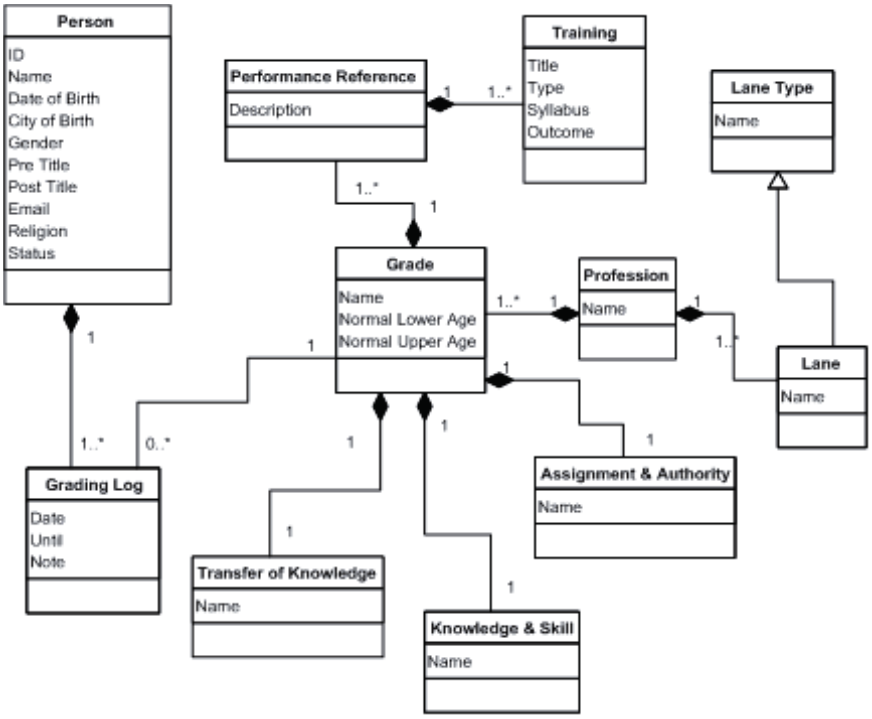

Fig. 6. The Relation among Personil and Grade Model

5. Case Study

A case study of this research was carried out on an automobile assembly industry. The strategy that was used to arrange a business tree is shown in Fig. 7. Standard Operating Procedure (SOP) for each workstation was derived from Assembly Operation Sheet (AOS) for vehicle manufacturing. Each SOP placed on a workstation beside consist of operation sequences also fulfilled with operation time standard, qualification needed, and required number of operators (see Fig. 7).

The developed application software at this research was a web-based application. Fig. 8 shows a part of developed profession trees. Not all lanes of each profession tree have the same number of grades. As can be seen at a profession tree of trimming, its operating lane has 9 grades, whereas its utilizing lane only has 7 grades. Those numbers of grades are based on the company requirement. As an example, a profession of information system management at vehicle assembly company maybe has number of grades less than the same profession at the information technology company. Where as for a certain profession lane requires a special pre requirement so impossible to be started from the lowest grade. As an example, the utilizing lane of trimming profession needs an undergraduate education, so there is no possibility to start this profession from the lowest level as for an operating lane at a trimming profession.

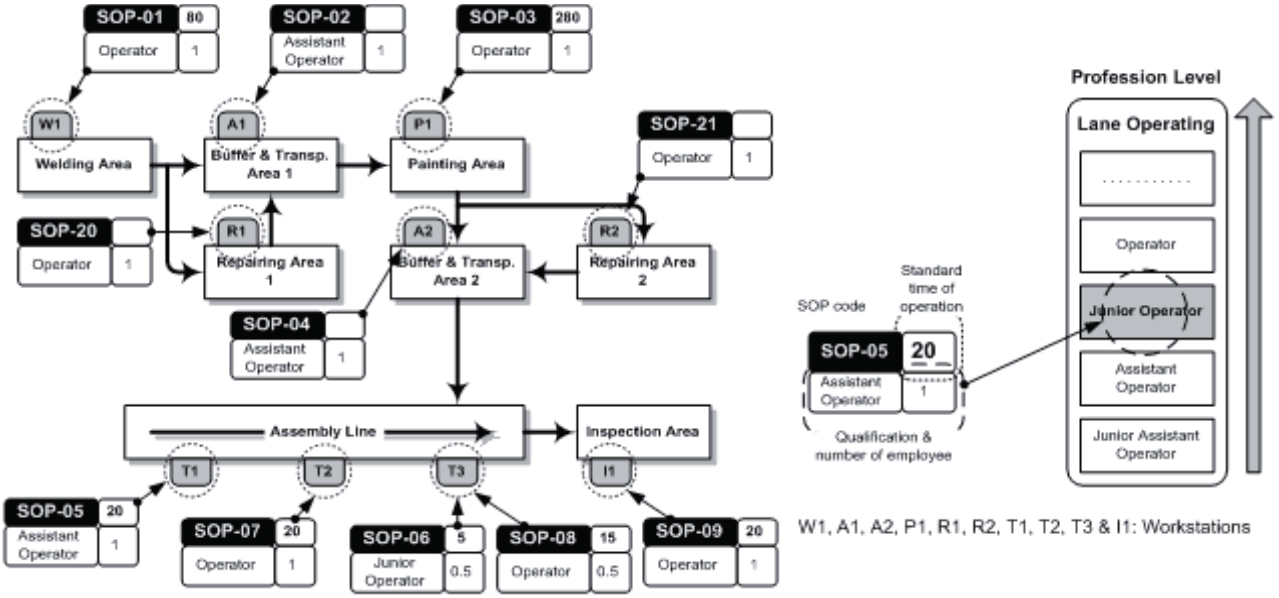

Fig. 7. Business tree arrangement strategy

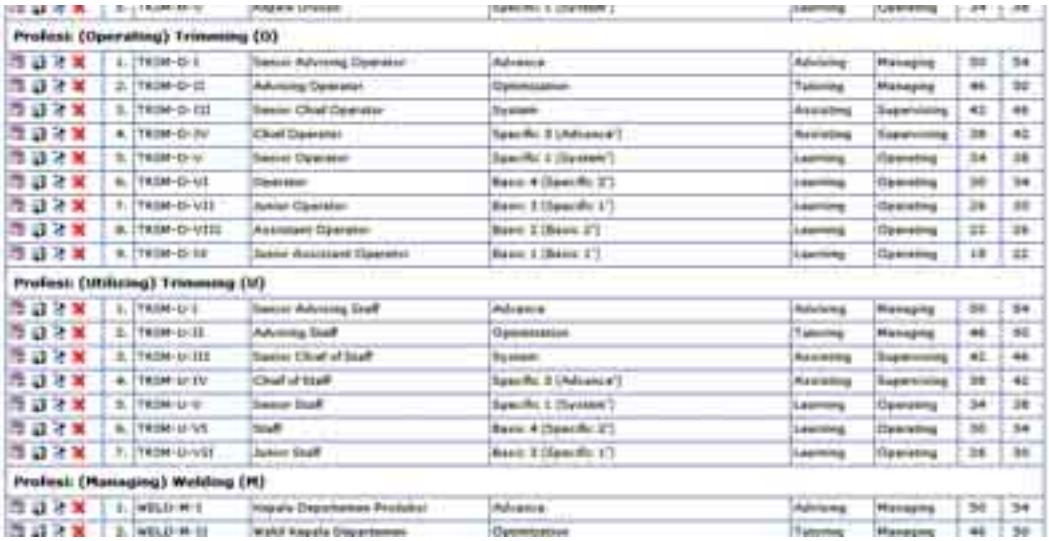

Fig. 8. A part of developed competency standard

The detail example of a business tree element is shown at Fig. 9. That figure shows the existing jobs/activities of a business tree element. Each existing job is classified based on job categories those are a plan, do, check, prevention, and action.

Fig. 9. Jobs/activities at certain business tree elements

After the arrangement of business tree finish, the next step is to connect the existing activities at this tree with the assigned organization to do those activities. The example of this relation is shown at Fig. 10.

Fig. 10. An organization element with assigned activities has to be done

Beside information about activities has to be done, Fig. 6 shows a matching profession grade to do those activities. Base on this data and profession grade of personnel, so the worker candidate who fulfilled the requirement can be found. The example of the candidate searching result is shown at Fig. 11. Fig. 12 shows a functionary determination for a certain organization element base on the searching result data.

Fig. 11. Screening of workers who match with the requirement of an organization element

Fig. 12. A Functionary determination for a certain organization element

When the worker has been assigned to be a functionary of an organization element, so at that worker's data will appear jobs that have to be carried out. Fig. 13 shows jobs that have to be carried out by Head Lining Station Operator as a result of the assignment of that worker to be a functionary of an organization element of Head Lining Station Operator. The job assignment list is taken from the activities that are exist at a business tree and was assigned to certain organization element to be carried out.

Fig. 13. The job assignment list of a Head Lining Station Operator

6. Conclusion

The primary key of success of the utilization of this system is the arrangement of a business tree. The better the business tree arrangement the higher guarantee of a business success of the company, because better transparency of jobs that has to be done to reach the goal of the company development. In addition, because the job description is not directly paste on the organization element, will easily in company management. That easily in management mean when the company changes its organization, so there is no requirement to redefine job description for each organization element. The required action is to determine which activities are carried out by a certain organization element.

By integrating a business tree, organization, and competency standard, determining a functionary of certain organization elements who match with requirement and company business needs will be easier. This is cause by the requirement for a certain functionary has been decided based on jobs have to de carried out to realize company business activities.

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