

HUMAN RESOURCES GRADING FOR PRODUCTION ENGINEERING PROFESSION IN COMMERCIAL VEHICLE ASSEMBLING PLANT BASED ON PROFESSION WITH 3 LANES GRADING HUMAN RESOURCES DEVELOPMENT CONCEPT (PT. KRAMA YUDHA RATU MOTOR CASE STUDY)

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Abstract

Human resources are utilized by companies to achieve goals. Therefore the need for human resources must be designed and planned in order to avoid inappropriateness between the requirements of the corporate society as a user and the provider of human resources. By considering human resources as an important factor, all parties involved in this effort including the corporate society, must recognize a common responsibility to plan and prepare the need for human resources. PT. Krama Yudha Ratu Motor (KRM) is a vehicle assembly plant located in Jakarta, Indonesia. KRM produces commercial vehicles under the brand of Mitsubishi and Mitsubishi Fuso. KRM utilizes Production Engineering division to handle development and information. KRM Production Engineering division performs the function of development and improvement of production facility and also engineering information management.

KRM applies Profession with 3 lanes grading human resources development program to the Production Engineering profession. KRM requires a systematic, well planned and well patterned human resources development program in order to develop highly competent technicians, engineers and staffs especially in the production engineering profession. By possessing highly competent technicians, engineers and staffs, KRM is planned to gain a competitive advantage in human resources.

Profession with 3 lanes grading (P3JJ) human resources development concept gives a systematic explanation of job identification process for each profession which are utilized by organizations or companies. The result of this job identification process is used to develop and grade the three functional lanes in each profession which are the operating lane, the utilizing lane and the managing lane. In each functional lane, definition and interpretation of human resources capability parameters are performed in order to generate performance references, appropriate assignment references and training materials. The outcomes of this series of processes are utilized to make training programs, human resources assessment method and human resources development programs. Currently, KRM is in a phase of application preparation for profession with 3 lanes grading human resources development concept and preparing to connect it with KRM production information system.

Keywords: *profession with 3 lanes grading (P3JJ) human resources development concept, human resources management system, welding profession, PT. Krama Yudha Ratu Motor*

1. Introduction

Human resources are one of the factors that influence the efforts to make products or production beside machine, method, material and environment. Competent and skilful human

resources will be one factor in producing high quality products in accordance with customer demand. Systematic, well planned and well patterned human resources management and development will be one base for PT. Krama Yudha Ratu Motor (KRM) to be a company that has a competitive advantage.

Production Engineering activity is one activity conducted by KRM as a supporting activity of the company as a commercial vehicle assembling plant that performs the production operation which consists of welding, painting and assembling process. The activity of KRM production engineering division consists of:

1. continuous improvement of KRM production activity,
2. research and development of KRM production facility,
3. administration and management of engineering information,
4. inspection and control of KRM production processes.

Systematic, well planned and well patterned human resources management and development based on profession with 3 lanes grading in KRM Production Engineering profession is aimed to produce highly competent technicians, engineers and managers. These highly competent and skilful personnel will perform various functions in accordance with the needs of the company.

2. Profession with 3 lanes grading (P3JJ)

Profession with 3 lanes grading (P3JJ) is a general human resources development pattern to create various professions which are required by industrial market. Profession with 3 lanes grading is focusing on definition and interpretation of human resources capability parameters and also assignment references in order to match between the capability of personnel and the major of expertise.

Variety between businesses, jobs and professions is viewed to have connections between one another. These varieties are described by the forms of trees which are the business tree, the job tree and the profession tree. The business tree is classified by kinds of services or products. The job tree is classified by technologies and processes. The profession tree is classified by kinds of studies and level of difficulties. Every tree has a different internal changeability. The business tree can change due to organizational and economic aspects. The job tree can change due to technological aspects and the profession tree can change due to studies aspects.

The profession tree has three lanes equal in rank which are:

1. The Operating Lane
This lane emphasizes on the operation of machinery / equipment / method / program where skill aspect is prominent.
2. The Utilizing Lane
This lane emphasizes on the utilization of main facility and supporting facility where analysis aspect is prominent.
3. The Managing Lane
This lane emphasizes on the management of jobs where job completion coordination aspect is prominent.

3. The Production Engineering Profession in KRM

As previously said above, Production Engineering (KRM PE) activity is one activity conducted by KRM as a supporting activity of the company as a commercial vehicle assembling plant that performs the production operation which consists of welding, painting and assembling process. The activity of KRM production engineering division consists of:

1. continuous improvement of KRM production activity,
2. research and development of KRM production facility,
3. administration and management of engineering information,

4. inspection and control of KRM production processes.

Continuous improvement of KRM production activity is conducted by KRM PE by monitoring, controlling and improving the process parameters of KRM welding, painting and assembling process in order to gain optimum efficiency and affectivity.

Research and development of KRM production facility is conducted by KRM PE by evaluating, monitoring and improving the machinery, equipments, utilities and facilities used by KRM production activity.

Administration and management of engineering information is conducted by KRM PE by processing, analyzing, distributing various forms of engineering information required by KRM.

Inspection and control of KRM production processes is conducted by KRM PE by evaluating, monitoring and controlling the resources used by KRM welding, painting and assembling process in order to achieve affectivity according to KRM standards.

4. The background of human resources levelling in production engineering profession

In performing the business of production, human resources have become a very important factor for KRM. This is caused by the labour intensive system applied by KRM, which is a system that relies mainly in man power to perform all production business activity. Nevertheless, KRM did not have an adequate human resources development system, so the following problems occur:

1. loss of knowledge when an employee retires or resigns,
2. improper job documentation,
3. career paths that did not consider about the development of professions and potention of employees.

In order to solve these problems, a systematic, well planned and well patterned human resources management system becomes imperative to be possessed.

KRM requires a human resources management system that is capable to form and develop experts that are competent and possesses various skills. The human resources management system that KRM wishes to have is expected to be able to manage the development of the knowledge and skills of the experts periodically and gradually according to the level, so that the experts are formed in the fields required by KRM.

This problem has become one of the obstacles for KRM to grow and become a better company. By applying Profession with 3 lanes grading in production engineering profession, this problem is expected to be solved and other professions that are utilized by KRM can follow the same steps to solve this problem.

5. Application steps of human resources levelling based on profession with 3 lanes grading pattern

Human resources levelling based on profession with 3 lanes grading pattern is started by planning the number of levels on three functional lanes and performing job identification on the profession that has become an object of levelling. The number of levels on three functional lanes is planned by considering the aspects of levelling, operational life time of personnel and job difficulty level. Job identification is performed by using wall clock analogy in order to divide main job elements from supporting job elements.

After planning the number of levels on three functional lanes and performing job identification, definition and interpretation of human resources capability parameters are performed. The definition of human resources capability parameters is aimed to form a definition of capability parameters that can form experts according to the results of job identification and levelling plan clearly and sequentially on each level. The interpretation on human resources capability parameters is aimed

to match between the production engineering profession that has become an object of measurement and the definition of human resources capability parameters that has been made previously.

The generation of performance references is performed after the definition and interpretation of human resources capability parameters. Performance references are generated in order to give a sequential summary as a result of interpretation of capability parameters required by the company and will be used to measure the performance of personnel.

After the generation of performance references, the generation of appropriate assignment references and training materials is performed. The generation of appropriate assignment references and training materials is aimed to direct the utilization of personnel according to the performance references on their professions and levels and to assist personnel in obtaining career achievements according to the subjected performance references.

6. Planning the number of levels on three functional lanes

The planning for the number of levels is performed on the managing lane, the utilizing lane and the operating lane. The managing lane is planned to have five functional levels and general administrative works levels. The utilizing lane is planned to have seven functional levels. The operating lane is planned to have nine functional levels. The result of planning for the number of levels can be seen on Tab. 1.

From the planned number of functional levels which will be possessed by each lane, the levelling according to the three aspects of levelling are performed. The three aspects of levelling are knowledge and skill, transfer of knowledge and assignment and authority as seen on Tab. 1.

Tab. 1. Table for Planning the number of levels on three functional lanes and Levelling according to the three aspects of levelling.

Level	Knowledge and Skill	Transfer of Knowledge	Assignment and Authority	Managing Lane	Utilizing Lane	Operating Lane
1	Integration 2	Advising	Directing	Manager	Senior Advising Engineer	Senior Advising Technician
2	Integration 1	Advising	Managing	Assistant Manager	Advising Engineer	Advising Technician
3	Advance	Tutoring	Supervising	Supervisor	Senior Chief Engineer	Senior Chief Technician
4	Optimization	Tutoring	Supervising	Foreman	Chief Engineer	Chief Technician
5	System	Assisting	Operating	Assistant Foreman	Senior Engineer	Senior Technician
6	Specific	Assisting	Operating	Administrative Works	Engineer	Technician
7	Basic 3	Learning	Operating		Junior Engineer	Junior Technician
8	Basic 2	Learning	Operating		*	Assistant Technician
9	Basic 1	Learning	Operating		*	Junior Assistant Technician

The knowledge and skill aspect is planned to have nine qualitative levels from the highest to the lowest listed as follows:

1. Integration 2
2. Integration 1
3. Advance
4. Optimization
5. System
6. Specific
7. Basic 3
8. Basic 2
9. Basic 1

The transfer of knowledge aspect is planned to have four qualitative levels from the highest to the lowest as follows:

1. Advising
2. Tutoring
3. Assisting
4. Learning

The first and the second level are on the advising level. The third and fourth levels are on the tutoring level. The fifth and sixth levels are on the assisting level. And the seventh until the ninth level are on the learning level.

The assignment and authority aspect is planned to have four qualitative levels from the highest to the lowest as follows:

1. Directing
2. Managing
3. Supervising
4. Operating

The first level is on the directing level. The second level is on the managing level. The third and the fourth level are on the supervising level. And the fifth to the ninth level are on the operating level.

7. Job identification for production engineering profession

Job identification for production engineering profession in commercial vehicle assembling plant is done by using wall clock analogy as seen on Fig. 1.

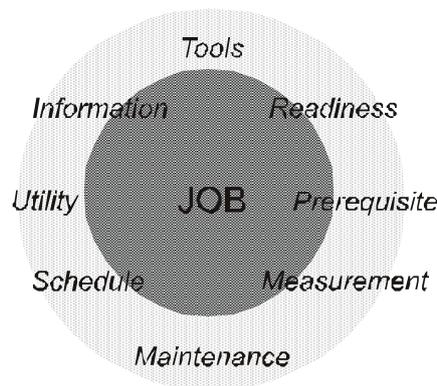


Fig. 1. Wall clock analogy for job identification

The result of job identification for production engineering profession in commercial vehicle assembling plant using wall clock analogy can be seen on Fig. 2.

8. Definition and interpretation of human resources capability parameters

Human resources capability parameters are defined to five aspects of job execution according to ISO suggestion which are:

1. Plan
2. Do
3. Check
4. Prevention
5. Action

These human resources capability parameters are also defined to five aspects of successfulness guarantor of job according to the eight numbers on the wall clock analogy of the job that are summarized into five aspects as follows:

Information	Tools	Readiness/Catalyst
Equipment Drawing, Installation Drawing, Part Drawing, Assembly Operation Sheet, Engineering Order, Standard Operating Procedure, Engineering Part List, Production Parts List, Packing List Maintenance Report, Product Quality Evaluation, ISO Procedure System Standards, ASTM Standard, JIS Standard, Other Engineering Resources.	Machine tools, Workshop tools, Measuring tools, Workbench tools, Hand Tools, Engineering Softwares.	KRM 18 Competence Points, 5S, Quality Control Circle, Rewards, Training Programs, End Year Incentive, Production Service Incentive, Extra Service Incentive, Seminars, Profession with 3 Lanes Grading Human Resources Development Concept
Utility	JOB	Prerequisite
Electrical Power, Compressed Air, Water, Working Room, Working Area, Computers, Office Stationery, Desks, Chairs, Industrial Safety Equipments, Measuring Equipments	<p>PRODUCTION ENGINEERING in a commercial vehicle assembling plant : providing various engineering services in forms of: 1. continuous improvement of production activity 2. research and development of production facility 3. administration and management of engineering information 4. inspection and control of production processes Main Tools: - Production Engineering Knowledge - Production Engineering Skills - Production Engineering Personnel Qualifications</p>	PE Customer Request and Feedback, Engineering Order
Scheduling, Planning, Allocations	Maintenance, Waste Treatment	Monitoring, Measurement/Assessment, Verification, Follow Up
Production Engineering Annual Activity Plan, Monthly Production Schedule from PPC, Daily Production Schedule from PPC, Spare Part Schedule from PPC, Coordination Meeting, Man Power Allocations, Personnel Rotation Plan, Equipment Replacement Plan, Sub Material Requirement Plan	Maintenance of Machine tools, Workshop tools, Measuring tools, Workbench tools, and Hand Tools; Training Programs, Work Area Waste Separation according to ISO 14001 Standards,	Production Engineering Annual Activity Plan, PE Investigative Reports, PE Trial Reports, ISO 9001, ISO 14001, Internal Audit, External Audit, Krama Yudha Group Audit, Process and Product Audit, Customer Audit, Annual Division Target and Improvement Program,

Fig. 2. The result of job identification for production engineering profession in a commercial vehicle assembling plant using wall clock analogy

1. Planning/Allocations/Scheduling
2. Technology/Tools/Practical Methods
3. Theory/Hypothesis/Information/ Prerequisite
4. Studies/Activator/Catalyst
5. Monitoring/Assessment/Follow Up

The result from the definition of human resources capability parameters for the operating lane level 5 Senior Technician can be seen on Tab. 2.

Interpretation of human resources capability parameters is made to conform between the professions that have become the object of measurement with the definition of human resources capability parameters which has been made previously.

The result from the interpretation of human resources capability parameters for the operating lane level 5 Senior Technician for production engineering profession in a commercial vehicle assembling plant can be seen on Tab. 2.

9. The generation of performance references

Performance references are generated to give a sequential summary as a result from the interpretation of capability parameters required by the company. According to the result from the interpretation of human resources capability parameters on each level, performance references are generated to be used in designing appropriate assignment references and training materials and also to measure the performance of personnel.

The performance reference for the operating lane level 5 Senior Technician for production engineering profession in commercial vehicle assembling plant can be seen on Tab. 2.

Tab. 2. Definition and Interpretation of human resources capability parameters including Performance reference for the operating lane level 5 Senior Technician for Production Engineering profession in a commercial vehicle assembling plant

Level:	Senior Technician	Profession:	Production Engineering in a Commercial Vehicle Assembling Plant	Organization Division:	Production Engineering
5; System (System C), Assisting, Operating					
Full Scale Grading of Knowledge and Skill			Degree of Difficulty	Transfer of Knowledge	Assignment &
Level Number	5	System	medium	Assisting	Operating
	<i>Auxiliary Scale</i>	<i>System C</i>			
Job Elements for Operating lane					
1. Plan		2. Do		3. Check	
4. Prevention		5. Action			
Definition of Human Resources Capability Parameters					
Modification; Separation of Components;	Operating Highly Sophisticated Equipments / Methods;	Utilizing Highly Sophisticated Engineering Information / Data; Utilizing Engineering, Logistics and Administrative Information / Data	Repairing Components / Module; Overhaul; Comissioning; Recalibration;	Break Down Analysis and Follow Up;	
Interpretation of Human Resources Capability Parameters					
Providing a thorough analysis and solutions of investigated problems	Investigating parts and equipment problem, Providing investigative reports, Providing standard operating procedures, Conducting Trials on new vehicle parts, Conducting Trials on new vehicle model, Providing decisions regarding solutions of problems	Mastering the use of Engineering Informations, Work Assignments, Inspection Manuals, Standard Operating Procedure and Quality Control Process Chart; Knowing, Preventing and Reporting Inappropriateness;	Cleaning of Equipments; Organizing of Tools, Prevention of Break Downs; Possesing the Basic Knowledge of Machine Construction; Providing Activity Schedule	Reporting Daily Activity to Superiors; Making Routine Written Reports; Participating in Technicians Forum and Quality Control Circle/Group; Making Break Down Analysis;	
1. Planning /Allocations	2. Technology /Tools /Practical Methods	3. Theory /Hypothesis /Information /Prerequisite	4. Studies /Activator /Catalyst	5. Monitoring /Assessment /Follow	
Operational Success Element					
Performance Reference					
No.	General:				Specific:
1	Mastering the operation of every measuring equipment used to check the vehicle quality.				Participate in Technicians Forum and Quality Control Circle in order to develop communication and coordination skills.
2	Mastering the use of Standard Operating Procedure in order to prevent problems and defects in production process.				
3	Mastering the use of Install Drawing, Engineering Parts List, Production Parts List and Packing List Maintenance Report in order to prevent parts assembling mistakes.				
4	Mastering Occupational Safety and Health Procedure in order to prevent accidents.				
5	Mastering the Assembly Operation Sheet, Part Drawing, Install Drawing, Inspection Manual in order to Prevent Inappropriateness.				
6	Mastering the use of Engineering Order in order to control the corrections of parts and processes.				
7	Reporting Inappropriateness in order to be Analyzed and be Prevented.				
8	Able to clean equipments in order to maintain the condition of equipments.				
9	Mastering Project Management in order to lead development project properly.				
10	Mastering welding, painting and assembling process in order to inspect and control KRM production processes properly.				
11	Mastering the concept of feasibility study in order to analyze problems properly.				
12	Able to report daily activity to superiors in order to avoid inappropriateness conditions and continuous improvement agenda can be conducted.				
13	Understanding the system of written reports and the use of personal computers in order to make routine written reports.				
14	Knowing the Filing management system in order to manage the filing of reports.				

Tab. 3. Appropriate assignment reference and Training Material for the operating lane level 5 Senior Technician for production engineering profession in a commercial vehicle assembling plant.

Level: Senior Technician		Profession: Production Engineering in a Commercial Vehicle Assembling Plant		Organization Division:	Production Engineering
APPROPRIATE ASSIGNMENT REFERENCES			TRAINING MATERIALS		
No.	Initiation:	No.	Main:		
0	Job Orientation in Production Engineering Division with the Production Engineering Foreman in order to fulfil the tasks as a Senior Technician.	1	Occupational Safety and Health		
			Welding Safety Equipments; Occupational Safety Standards in Welding; First Response in Welding Accidents;		
	General:	2	Engineering Materials		
1	Conducting Investigation and Prevention of Problems		Deformations; Stress and Elongations; Dislocations; Cracks;		
2	Assisting all Technicians in Production Division in mastering the Standard Operating Procedures and Quality Control Process Chart to Maintain the Quality of the vehicle product.	3	Material Properties and Structures		
3	Assisting all Technicians in Production Division in Maintaining all Equipments used in Production Division.		Atomic Structures; Crystal Structures; Imperfections in Solids; Phase Diagrams;		
4	Conducting Part and Equipment Trial.	4	Production Process		
5	Preparing and Operating Welding, Painting and Assembling Equipments.		Spot Welding Process; Gas Metal Arc Welding Process; Painting Process; Assembling Process		
6	Setting Welding, Painting and Assembling Process Parameters.	5	Engineering Drawing		
7	Writing Daily Reports.		Dots, Lines and Planes; Perspective; Projections; Dimensions;		
8	Cleaning equipments and area.	6	Geometric Specifications		
9	Performing Project Coordination.		Tolerance; Standards;		
10	Performing Component Modification Analysis.	7	Basic Quality Management System		
11	Performing Equipment and Facility Break Down Prevention and Analysis.		Introduction of ISO 9001 and ISO 14001		
12	Managing the Filing of Reports.	8	Basic Maintenance		
	Specific:		Production Machine Construction; Maintenance Procedures; Lubrications;		
13	Participating in Technicians Forum and Quality Control Circle.	9	Reporting System		
			Writing Procedures of Engineering Reports;		
		10	Engineering Information		
			Engineering Drawing; Part Drawing; Installation Drawing; Engineering Parts List; Production Parts List; Uniform Parts Group; Assembly Operation Sheets; Standard Operating Procedures; Engineering Order; Engineering Change Request;		
		11	Personal Computer Operations		
			Microsoft Office;		
		12	Cost of Production		
			Components of Production Time; Components of Production Costs; Production Core Price;		
		13	Tools Engineering		
			Jig & Fixtures; Clamping of Workpieces;		
		14	Production Management		
			Basic of Production Organization; Theory of Service; Continuous Improvement; Problem Solving Skills;		
		15	Production Systems		
			Scheduling; Allocation of Resources		

10. The making of appropriate assignment references and training materials

Appropriate assignment references and training materials is made to direct the utilization of personnel according to the performance references on their professions and levels and to assist personnel in obtaining career achievements according to the subjected performance references.

Appropriate assignment reference and training material for the operating lane level 5 Senior Technician for welding profession in commercial vehicle assembling plant can be seen on Tab. 3.

11. Conclusion and suggestion

11.1. Conclusion

From this research we can conclude that:

- Human resources are very important to be taken into consideration.
- A systematic and measurable human resources development system becomes imperative to have if a company wants to have a competitive advantage.
- Profession with three lanes grading human resources development concept is one of the best approach that can be performed in order to achieve a competitive advantage in human resources aspect.
- By applying profession with three lanes grading human resources development concept, the company is able to develop professional human resources as a basis for corporate development with proper flexibility and effectively.
- In production engineering profession, human resources levelling can be planned for the managing lane, utilizing lane and the operating lane.
- The levelling is performed by making nine levels that can be followed gradually and sustainably.
- The achievements of personnel that have become an object of human resources development program can be measured systematically and consistently considering that the performance references and training materials are well planned.
- A human resources development system that can form and develop skilful technicians, engineers, staffs and managers according to profession with three lanes grading human resources management concept can be built in KRM.

11.2. Suggestions

It is suggested that PT. Krama Yudha Ratu Motor performs levelling using the same methods for other required professions. A great benefit in forms of competitive advantage in human resources aspect will be gained if KRM is consistent in applying profession with three lanes grading human resources development concept that has been agreed to be applied. KRM will face obstacles and challenges in performing human resources development and other developments in the corporate development agenda. But KRM will be able to face and overcome those problems with hard work, dedication and responsibility.

References

- [1] Rochim, T., *Pola Dasar Pengembangan SDM P3JJ Profesi Dengan 3 Jalur Berjenjang*, Penerbit ITB, Bandung 2005.
- [2] Kalpakjian, S., Schmid, S. R., *Manufacturing Engineering and Technology*, 4th ed., Prentice Hall International, New Jersey 2001
- [3] Hall, K., Tashiro, H., *Lebih Baik Daripada Robot*, Business Week edisi Indonesia, hal. 24, 2006.