

Global Standard realizing process of Automobile Assembly Line

Byung-Chil Seo¹

Abstract: In the trend of globalization and location transfer of existing production bases is still characterized by an extremely unstable status between different countries and different regions. The results are negative impacts on cost, quality and speed of project implementation, especially automobile industry which is one of the most complex manufacturing sectors. In order to overcome problems from Global Standardization of Production Line and its Localization, it is highly required comprehensive coordination among design of production equipment, production technology, space and interfaces. It is necessary to set up standard of production equipment and building for parallel progress, in order to complete production line in shortest time for launching product. In addition, this standard should keep flexibility with consideration of local situation which means "Glocalization."

Keywords: Global standardization, Automobile Assembly Line, Production equipment, Globalization, Localization, Glocalization

I. INTRODUCTION

The world economy has become more globalized over the past 50 years. This trend in globalization is currently resulting in a migration of consumption flows and the production of technical goods from developed countries to both developing and undeveloped countries^[1]. As a consequence of this trend in globalization, international business operation and cross-border orientation have become important areas of focus for the manufacturing industry^[2]. The improvement of production systems together with the restructuring of existing production bases are now key issues for competing in global markets. "Foreign Direct Investment (FDI), global production and cross-border trade have accelerated dramatically since the late 1980s^[3]." One of the most challenging and competitive sectors is the automobile industry^[4].

The recent trend of global location transfer of existing production bases is still characterized by an extremely unstable status between different countries and different regions. The results are negative impacts on cost, quality and speed of project implementation^[1].

To reduce repeated trial and error and successful global location transfer of existing production bases, global standardization of production facilities and process has been developed. This session focus globalization of production line and problem status.

II. OUTLINE OF AUTOMOTIVE PLANT ASSEMBLY LINE

Automobile production process consists following sequences; Press (Panel forming) → Body (Body-building with Formed panel) → Paint (Painting and Surface treatment of Body Protection against Noise, Dust and

Rust) → Assembly (Assembling Engine, Parts and Utilities)⁵.

A. Press Process

Press Process is forming Panels which consist automobile's outer shape. It starts to cut coiled steel plate in proper size, and certain shapes of steel panels are made with Press machine which have formwork. Press Process is sequencing as following; cleaned steel coils are cut into each proper size of panel in Blanking line, moved into Press line and formed necessary shape with formwork and Press machine^[5].

B. Body Welding and Body-Building Process

Welding is joining two or more materials to be melt in a bonding position, or attaching them together with adding Filler Metal. Body-Building Process is making car shape with panels of car body in sequence of welding, sealer, hemming and finishing^[5].

C. Painting Process

Painting Process has following sequences; Pre-Treatment Line which is mainly for rust prevention, Electro Deposition Line which is coated paint inner- and outer side of body against rust, Sealer Line which is sealing gap between body and panels, Under Coating Line which is coated under the body or inside of wheel house for reducing noise and vibration during driving, Middle Coating Line which is for preventing surface damage from flying particles during driving and for better adhesion of next coating layer, Top Coating Line which is painting aesthetic color according to customer's

¹ Director of Hyundai Motor Group, 12, Heolleung-ro, Seocho-gu, Seoul, 137-938, Korea, sbc7272@hyundai.com (*Corresponding Author)

requirement, and Clear Line which is for securing resistance against ultraviolet rays and acid⁵.

D. Assembly Process

Assembly Process is final process producing car as a product, which is assembled and implemented with approximately 30,000 parts such as interior, cock-pit, seat, wind-shield, electrics, and with units like engine, transmission, wheel axle, etc., with wiring and piping work including quality control in order to be completed as vehicle. And Test Line consists of several checking, function checking and adjustment such as wheel alignment test, head-lamp angle adjustment, engine room inspection, brake test, exhaust gas test, water proof test, etc⁵.

III. GLOBAL STANDARDIZATION OF ASSEMBLY LINE

Global standardization has been accelerated dramatically since last 10 years especially by Korean automobile maker. During this procedure, it has been developed Global standardization. During early stage of overseas expansion, there were difficulties to communicate and has low efficiency due to non-compatible and domestic market oriented system such as part table, Drawing system and Code system. In addition, inefficient indirect cost happened in order to connect each part such as Production, Sales, Logistic, etc., which have different structure. And, Automation in the factory is well-developed; however indirect work such as Design is still under development. One unique characteristic of automotive industry is, that all construction procedures have been decided backward sequence with focusing timing of selling complete cars, in order to prior occupation in the market. Therefore it is seriously required to shorten delivery schedule such as optimization of equipment specification, because most of processes have been progressed in parallel, such as Selection of Product equipment, Building Permit, Design, Construction, etc.

IV. PROBLEM STATUS (CASE STUDY – A PROJECT)

During A project, it had been occurred 387 Variation order during construction period. It is mainly caused by non-proper input which means change requirement from production requirement. To avoid such unstable cost, schedule impact, it is required to make a further direction according to analyzing issued problems.

1) *Matching between Building and Production equipment*: Keeping durability of Building and Production equipment based on securing installation quality

2) *Matching Delivery time (Schedule)*: Keeping schedule for mass-production through analysis of expected problem and counter measure (Production equipment and Building)

3) *Utility*: Comprehensive analysis and counter measure regarding utility supply combined with Building construction, Production equipment installation, Trial operation and Mass production

V. CONCLUSION

In order to overcome problems from Global Standardization of Production Line and its Localization, it is highly required comprehensive coordination among design of production equipment, production technology, space and interfaces.

It is necessary to set up standard of production equipment and building for parallel progress, in order to complete production line in shortest time for launching product.

In addition, this standard should keep flexibility with consideration of local situation. It means, generally Global standard of production equipment is necessary for each Process Line as a rule, while flexible application is also required for according to each local hygienic, environmental and safety related situation which means “Glocalization^[6]”.

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