The global standard realizing process of the Automobile Assembly Facility

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Abstract: To realize the global standard of the assembly facility, one of key point is an influence of local characteristic. The global standardized information could be a useful input, especially at the beginning stage of the project. The content should be carefully checked against local requirements, in order to develop an Assembly Facility design to meet local regulations & characteristics. The level of input information required in each step is different depend on regions & countries. At an execution stage of the project, the global standard input needs to be updated as customized final input for the construction. There will be many issues to be clarified and coordinated so that the Assembly facilities meet the final requirements for the production technology. As a result, it is important to understand the timing to use the global standard information and the contents what is needed to adapt to the local characteristics. And close collaboration between production technology team and facility team is always required.

Keywords: global standard, automobile plant, assembly facility, local characteristic,

I. Introduction

In line with the globalization of the manufacturing industry in recent years, assembly facilities are also preparing for a global shift from “a localized building rooted in the regional characteristics” to “the world standardized building for manufacturing purpose".

One of the most significant features of architecture is that a building cannot be free of the influence of indigenous characteristics, such as the local landscape, climate and culture. An assembly facility is needed to be adopted by local regulations, to fulfil the requirements for suitable building in that region.

As the first topic this time, two different aspects will be examined: global standardization items, and local characteristic items. The second topic is the consideration of the input information linked with project steps, needed to obtain accurate information at the right time, to proceed with the project without hindrances such as a Stop-work-order or Variation-order.

II. Outline of automobile plant

Automobile plant projects are generally divided into delivery, production and dispatch areas (Table 1) [1].

A. Delivery Area

Since the main function of the delivery area is the distribution of raw materials and supplier parts to the plant for manufacturing and assembly[1], there must be many kinds of delivery area located in every shop. This is the one of most characteristic point of the automobile assembly facility.

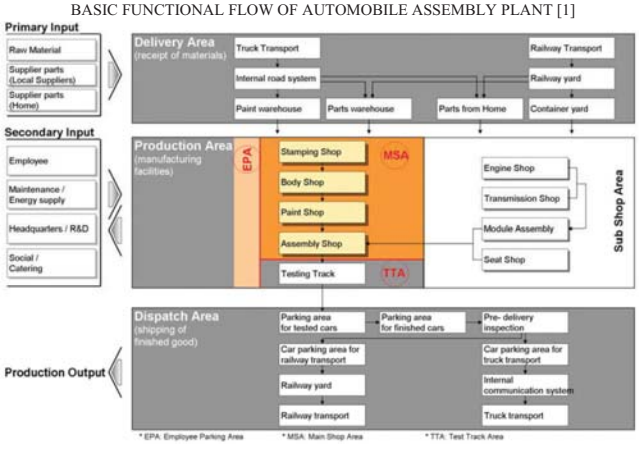
B. Production Area

The main production shops (production area) consist of stamping, body, paint and assembly shops. The layout of the four main shops is based on the concept of production flow. All of the shops are connected directly, or through a conveyor-bridge[1]. This form composition of all shops is to be carefully designed based on the client concept and the characteristics of the site.

C. Dispatch Area

The main function of the dispatch area is storing and shipping of the completed built-up unit (CBU). It consists of the following main facilities: parking area for tested cars, parking area for finished cars, pre-delivery inspection, parking area for cars to be transported by truck or rail[1].

TABLE 1
BASIC FUNCTIONAL FLOW OF AUTOMOBILE ASSEMBLY PLANT [1]



III. Point for global standardization, and local characteristics

A. Input Information

The manufacturer operates assembly facilities around the world, and has already accumulated enough know-how and standard principal concept. It will be quite useful input

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information (as Global Standard input) especially at the preliminary stage, in case of collecting up the principal concept as a Program of Requirement (POR). The necessary information at the preliminary stage will be as follows,

-The assembly facility master plan (concept plan)
-Production technology layout (Production line plan)
-Utility requirement list of each machine
-Delivery information (raw materials & supply parts)
-Dispatch information (CBU, parking and rail plan)
-Waste information
-General outline requirements for building (building height, floor load, hanging load, basic columns span, utilities requirements)
-Others

B. *Local Characteristics*

Some items, especially assembly facility master plan will be influenced by the local characteristics that have 2 aspects:

1) Geometry & Climate Characteristic: land shape, land contour, soil condition, landscape, nature climate condition (temperature, wind, rain, and snow)

2) Local Code: environmental & safety requirements and regulations (building law, fire, hygienic, labor safety, environment, others).

The content of the POR should be carefully checked against local requirements, in order to develop an assembly facility design to meet local regulations & characteristics.

Fire safety is the one of important issues in local regulation. The position of the firewall which separates fire compartments within a certain area, and the requirement of fire-fighting equipment will make a big impact on the production line layout. It is highly important to hold a fire study workshop with the client at an early stage.

Utility requirement of production machines, Delivery & Dispatch information, Waste information, and General outline requirement for building can be retained as global standard input information. Besides, each detail should be fixed as "For Construction" at later project stage (Procurement and construction stage).

IV. Standard Project Steps for the Assembly Facility Project

A. *Project Steps*

There are several steps for the assembly facility project. Following is an example of the project steps.

(1) FS stage (Feasibility Study)
(2) Concept Design & Basic Design
(3) Permission stage
(4) Detail Design
(5) Procurement (including Production, delivery)
(6) Construction on site
(7) Commissioning/Inspection

It is essential to get the necessary input information from the manufacturer all the times at any stage in order to carry out the appropriate design & construction work. As the necessary information will be quite detailed, it is reasonable to consider dividing the timing of input collection into several steps.

B. *Planning Stage* [Design stage (1) – (3)]

The input information can be matched with the global standardized input (POR) at this stage. The influence of the local characteristics requires careful attention in some countries. The environmental impact assessment can be mentioned as typical example of this case, and its input information must be detailed even at the beginning stage.

The level of input information required is different from regions & countries, and the correct & efficient input-collection, based on enough experience of the regional characteristics, is the key point of the project management of this stage.

C. *Execution Stage* [Construction stage (4) – (7)]

As the project stage moves ahead, detailed information will be updated to the real planning of each customized production technology. It continues changes & adjustments day by day, and a huge amount of coordination can be expected. To keep the time and cost under control, the scheme of the delivery system is important, and the Design-build system is always suitable to keep single responsibility for cost, time and quality.

V. Conclusion

For assembly facility design & construction, it is important to understand when it is possible to use the global standard information and what is needed to adapt to the local characteristics.

The global standardized information could be a useful input for the facility planning. On the other hand, the local characteristics must be an important aspect for the development of the global standardized input to a real project on a planned site. At a later stage of the project, it will be developed to the customized final input for the construction.

Throughout all project steps, continuous communication and input update is mandatory, and it can be the one of major source of complexity of the project.

In view of this, the hand-in-hand collaboration by the production technology engineer and the facility design-build contractor is essential to put the project into the best practice of the assembly facility in the global market.

References

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