

**MASTER**

**Design of a production allocation strategy for galley factories**

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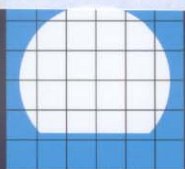
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**DRIESSEN**  
AIRCRAFT INTERIOR SYSTEMS



# **“Design of a production allocation strategy for galley factories”**

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You cannot create experience, you have to undergo it.

*Albert Camus*

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## Abstract

Driessen Aerospace Group designs, produces, and markets aircraft and train interiors and equipment. This thesis handles with the production allocation strategy of the Driessen Galley Systems Division. After the disposition of the Mexican plant, this strategy needed to be reviewed. Therefore the performances of the different facilities are compared and reasons for the differences are discussed. Based on the results of the analysis, a short and long-term production allocation strategy is designed, keeping in mind the changed market situation and forecasts.



## Acknowledgements

This graduation project can be characterized by lots of ups and downs. I would like to thank my supervisors from the TU/e, the late dr.ir. A.D.M. van de Ven and drs. F.D.P. van Bel not only for their professional support but also for their moral support during this project.

For Driessen this last year has been a very turbulent time. Despite this, the employees in all the Driessen facilities were always willing to support me with my project. I really appreciate this and I would like to thank them for this supportive attitude. In particular, I would like to thank my supervisors within the company, in alphabetical order ir. B. Jongkind (former General Manager Mexicali facility), drs. A. Koenderman RA (Chief Financial Officer Driessen Aerospace Group) and drs. P.W.M. van Maanen (former President of the Galley Systems Division).

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Peter Schram  
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## Executive summary

### *Introduction*

#### **Company**

The Driessen Group designs, manufactures and provides global support for a broad line of products in the commercial aircraft interior industry. The company consists of four divisions; the galley inserts division, the galley systems division, the railway division and the special product division. This assignment is carried out at the galley systems division.

At the beginning of 2002 the galley division was employing about 760 employees. Production facilities were located in Holland (Wieringerwerf), USA (Garden Grove and Vista) and Mexico (Mexicali). The turnover of this division increased from \$ 43 million in 2000 to \$ 46 million in 2001. However, the division faced a loss of \$ 3.1 million in 2001.

#### **Products and market**

The galley division provides a wide range of products that are engineered to client specific requirements. The product range includes galley structures, class dividers, doghouses, VCC's (Video Control Centers), closets, crew rests and spare parts. The galley division in general produces products for installation in airplanes of two aircraft manufacturers, Airbus and Boeing. The customers however are mainly airlines and leasing companies. Driessen does not deliver its products directly to its customers, but to Airbus and Boeing.

The market for galleys is very dependent on the global economy. Since the world economy is declining since 2001 and this decline was accelerated by the tragic events of September 11<sup>th</sup>, the demand for galleys has slowed down. A pick up is expected in 2004.

#### **Current strategy**

This report handles with the redesign of the production allocation strategy of the Driessen galley systems division. This strategy aims at minimizing the costs of the division. This is done by:

- Minimizing production costs: by producing low complexity products in production facilities in low labor cost countries.
- Minimizing distribution costs: by producing close to delivery address of the galleys.
- Minimizing engineering costs: by doing the detail engineering in low labor cost countries.

For this reasons a factory in Mexicali, Mexico was opened. This was the low labor cost production site for low complex and long series Boeing products. The complex products could be produced in Garden Grove and Vista (California, USA).

In Wieringerwerf the Airbus engineering and production was done. A new facility in Plzen, Czech Republic was the low labor cost option for low complexity Airbus products.

## Assignment

However, based on several considerations, in 2002, Driessen decided to close down the facility in Mexico. Because of this decision the production allocation strategy needs to be reviewed. This leads to the following definition of the assignment:

Determine the optimal international production allocation strategy for the galley division thereby focusing at obtaining sustainable competitive advantage.

In order to validate the production allocation strategy, the report will answer three research questions:

1. Is the current international allocation strategy valid in the current situation?
  - a. How can the performance of the different plants be compared?
  - b. How do the performances of the different facilities relate to each other?
  - c. What are the main causes of the differences in performance between the different facilities?
2. What lessons can be learned from the Mexicali experience for the setup of new (satellite) facilities?
3. How to cope with the remaining facilities?
  - a. Does Driessen have to produce in three facilities?
  - b. Is the facility in the Czech Republic an option for production in the future?
  - c. Is engineering in all the plants necessary?

## Analysis

### Model

In order to validate the current production allocation strategy a model is selected out of the academic literature to compare the different facilities on delivery reliability, quality, and costs. These three components are the attributes for client satisfaction - availability, quality and costs - of the product that are translated into the characteristics of the production methods and the system.

Because all measurements need to be comparable between the facilities all cost components are measured per direct hour worked. Also the direct hours worked are compared between the different facilities. Cost measurements also include measurements of productivity.

### Measurements

Wieringerwerf scores better on delivery reliability than the other facilities. The American facilities score comparable to each other (Vista a little better than Garden Grove) and Mexicali scores worst. The delivery reliability of the Californian plants is influenced by the bad performance of the plant in Mexico. They also had internal problems and were influenced by changing customer requirements.

On the quality measurements Wieringerwerf also scores best. Mexicali again scores worst; Garden Grove and Vista show comparable figures. The differences between the facilities can be declared by different requirements of Airbus and Boeing, different quality systems, and different numbers of quality inspectors.

Looking at productivity, Vista shows the best results. Wieringerwerf is second, followed by Garden Grove and Mexicali. The costs in the Dutch plant, indirect as well



as direct, are high. This is partly caused by their over capacity. Direct production rates are comparable in the Californian facilities. Their engineering costs are much higher than they are in Holland and Mexico. Indirect and direct costs are lowest in Mexico, as expected.

Something peculiar occurs when the efficiency is considered. From these measurements it occurs that Garden Grove is scoring better than Vista. Wieringerwerf is performing best and Mexicali is doing worst. This is in contradiction with the productivity measurements where Vista scores best.

### **Declaring differences**

What declares the difference between efficiency and productivity measurements is the sales value. The sales value is influenced by many internal as well as external factors (for example learning curve effects and the bidding procedure). Because productivity is defined as sales value per direct hour worked this indicator doesn't give a good picture of the actual performance. The influences of the different factors are difficult to determine because there are no good working Management Information Systems.

The efficiency measurements (direct hours worked) give a more honest picture of the performance although also this indicator is subject to comments (e.g. a bad working hour registration system).

Because the plant in Mexicali scores bad on productivity, efficiency, quality and delivery reliability, the causes of this bad performance are investigated more thoroughly. Reasons for the bad performance were: No good feasibility study was done before opening the plant, there was no right support of the other facilities due to internal competition and there were internal problems. A lack of knowledge and skills, and failure of the management to adjust to the local culture caused these internal problems. Management did not recognize these problems in time and therefore wasn't able to take corrective actions.

### **Conclusions**

Based on the analysis, the reasons why the strategy did not work are the following:

- The strategy was not implemented fully yet when the market started declining.
- The reason why the strategy was not implemented is threefold:
  - There was not enough flexibility in production capacity. That the market started declining so strongly was not taken into account.
  - The processes and procedures (engineering and production) are not under control and important management information systems do not provide useful information. This makes it hard to open new facilities and therefore the international production allocation strategy could not work.
  - The setup of the facility in Mexicali was not done right. If the company wants to open a new facility in the future, the following points need to be taken into account: A better investigation on the environment of the facility needs to be done, a change in company culture needs to take place, the local management needs to adapt better to the local culture, and sufficient support of expats are key for the success of a new facility.

The basic assumptions that support the production allocation strategy are logical. If the conditions are in order, the strategy could work well. However, the current strategy implies that at least four production facilities have to be operating, two for every competence center.

## **Design**

In order to improve the strategy, the learning points from the analysis must be improved. These points are:

- the strategy needs to reduce production capacity because the total capacity is too big at this moment. This causes fixed costs per product that are too high.
- the production capacity has to be flexible because the aerospace market is very sensitive for economic changes.
- support the improvement of the engineering and production procedures, processes, and systems (Management Information Systems).

## **Long term strategy**

The current strategy is based on the use of two competence centers with decentralized engineering. When sharing all the knowledge only one engineering facility would be necessary (in Wieringerwerf). The total number of facilities necessary for production can then be minimized. The Dutch plant can do the difficult Airbus as well as the complex Boeing work. The extra distribution costs can be compensated by less fixed costs because there is one facility less. Easier Airbus work can be done in a low labor cost country in Europe, easier Boeing work can be done in for instance Mexico. This will save fixed costs and reduces the overall production capacity. When choosing the right low labor cost facilities also the flexibility of the production capacity can be improved. In any case the fixed production capacity will be cheaper (low labor costs). Disadvantages are that large investments that are required and that it asks flexibility from the employees.

## **Short term strategy**

Because there is no budget for large investments, a short-term strategy is developed to minimize costs of the division on the short term. This strategy is developed in line with the long-term view, but is focused on 'surviving' first. Airbus production must be transferred to Holland/Czech Republic and because that creates over capacity in the USA plants, Vista must be closed. This will create sustainable cost advantages (lower distribution costs and indirect costs), but will require investments in depreciating (equipment and materials) and real costs of close down. Corporate functions must support and coordinate this process.

## **Conclusions and recommendations**

Based on this graduation project the following main conclusions can be given:

- Current strategy: The assumptions supporting the current strategy are logical if there is enough demand. However, in order to reduce production capacity and in order to reduce costs this strategy can be improved by concentrating knowledge in one competence center and by producing the complex products near that center. Simpler products must be made in low labor cost countries close to Airbus and Boeing.
- Setup new facilities: When applying production in low labor cost countries, the processes, procedures and systems must be organized well. A good environmental research must be done on the availability of conditions for production, the company culture must support the strategy, the management must adjust to the local culture, and sufficient support from expats for the setup of the new plant must be available.

- Cope with current facilities: In order to reduce the costs necessary to let the division survive the current crisis, the facility in Vista has to be shut down. All Airbus work should be done in Europe (Wieringerwerf and Czech Republic) and all Boeing work should be done in Garden Grove.

Recommendations are:

- Performance indicators: Performance indicators have to be developed that make comparison between the different facilities possible. They have to be constructed in such a way that can be seen how the facility is performing and on the other hand stimulate general manager to focus on the results of the division instead of on the separate facilities.
- Management Information System: It is essential that the MIS's are improved. At the moment it is difficult to see where problems (and associated with that) costs occur. Implementing a good system will make it possible to improve the processes and makes it easier to make people accountable for their results.
- Procedures: People have to use the systems in the right way to make sure that the information that is recorder is right. Also the processes need to be executed in the right way. That is why general procedures have to be developed that can support the right use of systems and processes.
- Further research: Further research has to be done in the following areas:
  - Flexibility in work force in low labor cost countries
  - Cost implications of the long term strategy
- Standardization/innovation: More efficiency can be obtained when more standard/modular products are sold. This makes the optimization of the production process easier. Other competitive advantages can be obtained by looking at the possibilities of radical innovations in products. At this moment improvements in the products are only incremental.
- Diversification: The aerospace market is very sensitive for economic changes. It is advisable to look for new products that can form a stable basis for the division.

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