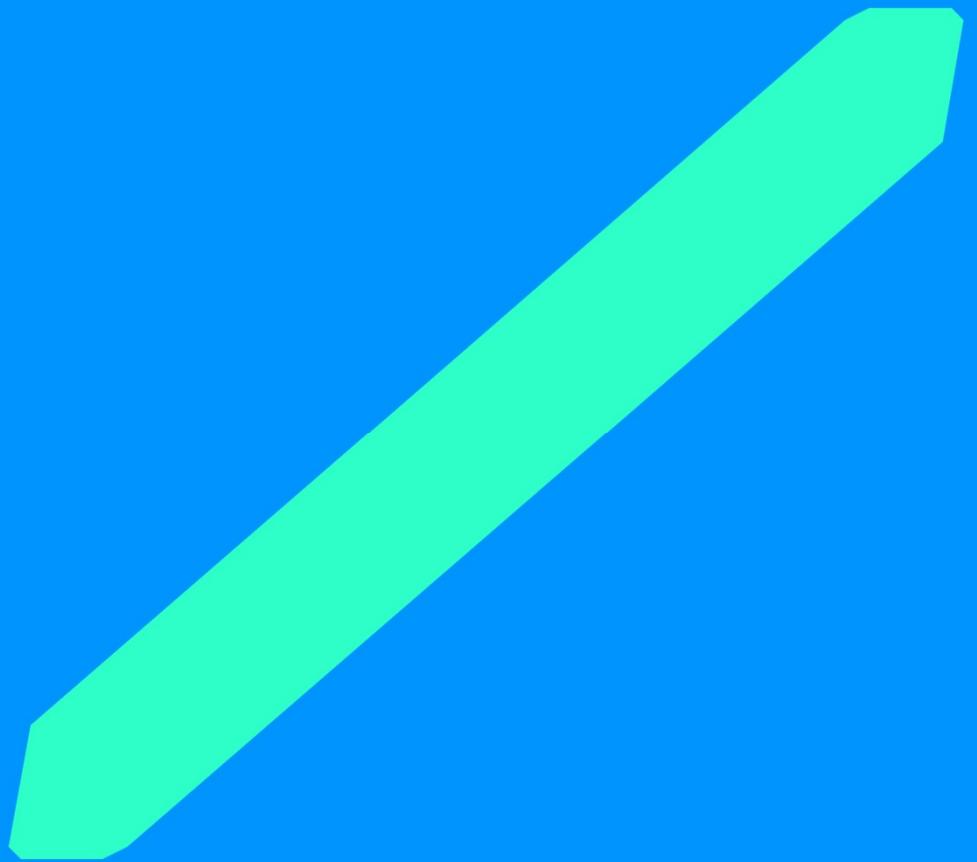


References.



*Industrial Excellence.
Count on 50 years' experience.*



Reference letter

Concerning:

Reference case letter – VDL Nedcar Line Balancing Project

Hereby, in the name of VDL Nedcar, I, Ron Sonnemans state that PDM Consulting B.V. (further to be called PDM) completed successfully the Line Balancing Project with excellent results and to our expectations.

The project description is attached to this certificate.

We wish PDM success with their further projects,

Sincerely,



Ron Sonnemans
Vice President FAS
VDL Nedcar

Case: VDL Nedcar

Significant cost reduction in production by means of the Line Balancing methodology

VDL Nedcar is an experienced car manufacturer, the only independent in the Netherlands. For fifty years, VDL Nedcar built cars for DAF, Volvo, Daimler Chrysler and Mitsubishi. Since 2012, VDL Nedcar is part of the VDL Group in Eindhoven and started building cars for BMW. Currently, VDL Nedcar manufactures four models: the BMW X1, the Mini Convertible, the Mini Countryman, and the PHEV variant of the Mini Countryman.

BACKGROUND

The factory of VDL Nedcar consists of four production departments – Press Shop, Body Shop, Paint Shop, and Final Assembly Shop (FAS), complemented by a complex logistics department. The production numbers increased significantly in the past few years. Consequently, the number of employees increased from 1.200 to 7.200. The takt time (production rate) in the FAS is set to 61 seconds, the interval at which one of the four models rolls off the production line. Accordingly, this is the time in which all 600 production employees in the FAS have to complete one job. Because of the possibilities of customisation by the customer, each of the 200.000 cars that are built of 7.000 parts annually, are unique. Therefore, the production processes are extremely complex.

ASSIGNMENT

The reason for the assignment is an efficiency target of 3% cost savings per year – this is an industry standard. Since VDL Nedcar has compromised on the target

recently, because of the introduction of multiple new (and increasingly complex) models, the efficiency target for 2019 has been set at a 5% cost reduction. Besides these reasons (complex processes and introduction of new increasingly complex models) VDL Nedcar acknowledges that it has a shortage of engineering capacity. Accordingly, the realisation of the efficiency target turns out to be a difficult assignment. Therefore, PDM was asked to support VDL Nedcar in achieving the cost savings. A target of a reduction of 35 jobs in the FAS has been set (in accordance with 5% cost saving).

PROJECT APPROACH

Prior to the actual start of the project, first a Quick Scan Assessment was executed to identify and address the optimisation potential and propose a customized project approach. Next, a project team with specific roles and functions – a mix of Expert Consultants and Manufacturing Engineers – was selected and prepared for the project.

PDM selected a Lean project approach for realizing the project goals, namely the Line Balancing methodology. Briefly, by means of Line Balancing, tasks within jobs will be reallocated more efficiently in order to ultimately reduce the number of jobs. This Line Balancing methodology consists of four crucial and consecutive steps: 1 – Scan Fundoshi's, 2 – Analysis optimisation potential, 3 – Implementation optimisation proposals, and 4 – Cashing.

Case: VDL Nedcar

1 – Scan Fundoshi's

As mentioned before, the FAS counted 600 jobs at the start of the project. On average, because of the various models and customizing possibilities by the customer, each job has 5 considerable variants. Analysing over 3000 jobs would be extremely time consuming. Therefore, by means of a Lean Quick and Dirty scan of all 3000 Fundoshi's*, for each job the potential for optimizing the job is defined. Here, a 50/50 breakdown is made. The low potential jobs – representing 50% of the jobs – will not be analysed in detail. Conversely, the high potential jobs – representing 50% of the jobs as well – will be analysed in detail.

2 – Analysis optimisation potential

Secondly, the analysis of the high potential jobs takes place. Here, the 'work, walk, wait' timings of all variants of each job will be measured and determined. Besides, the wastes (for instance, unnecessary walk, inefficient logistics, unnecessary activities, inefficient tooling and machinery, etc.) are addressed and solutions for minimizing these wastes will be proposed to the VDL Nedcar organisation.

3 – Implementation optimization proposals

Next, the proposed optimisations will be implemented together with the VDL Nedcar organisation. PDM intensively coaches and guides the VDL Nedcar organisation during this entire process of change and implementation.

After completing the first three steps, only the optimization of the jobs has taken place yet. Hereby, additional time has come available in the optimized jobs. As a result, significant additional Line Balancing potential has been released.

4 – Cashing

Finally, the most complex step – the actual Line Balancing – takes place. Taking into account various factors such as the production mix of the different models and variants, the quality of the processes, and the building sequence, tasks within jobs will be reallocated more efficiently. Here, time that has come available through the first three steps will be utilized. Each time all tasks of one job are reallocated to other jobs, the job has become redundant. Consequently, by removing this job from the production process a significant cost saving is realized.

PROJECT RESULTS

The results of the Line Balancing project are significant and diverse:

- ✓ Significant cost reduction in production. The cost saving are recurring on an annual basis during the entire model's lead time.
- ✓ More efficient processes.
- ✓ Increased quality.
- ✓ Less down time.
- ✓ Potential increased production volume.
- ✓ Balanced workload.

**A Japanese Lean term for the detailed work descriptions of a job, derived from the Toyota Lean philosophy.*

The impact of our work

“Within a week, your team defined more opportunities than my team in a month, because your team has a fresh view and is not suffering with historical-obstacles and company-blindness!”

Ron Sonnemans – Vice President FAS VDL Nedcar