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Value analysis for the machine-building industry

Client Case

Stuttgart, December 2005

A comprehensive value analysis program enabled significant savings in production of a recently introduced machine series

Case Summary

1 Initial Situation

- Increasing competition and changes in customers' requirements lead to rising pressure on prices
- To respond to these trends, a new machine series was introduced
- The first machines produced could only be sold below cost

2 Approach

- A top-down objective was defined to reduce costs by at least 10%
- The savings potential was validated by bottom-up measurements – these were defined and evaluated in mixed client teams
- A measurement system was installed to assign responsibilities and define timeframes

3 Results

- Manufacturing costs were reduced between 10% and 15% for each machine
- A Controlling tool was installed to track implementation and evaluate monthly impact on Income Statement

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Declining demands and different requirements forced a leading machine builder to develop a new product series

Initial situation

PRICES

Increasing pressure on prices due to
- Stagnating demand on a worldwide level
- Overcapacity on supply side in established European markets
- Increasing competition from suppliers from Far East

REQUIRE-MENTS

Change in customers' requirements
- Above average growth of medium market segment
- Increasing demand on flexibility of machines due to shorter product cycles

CONCEPT

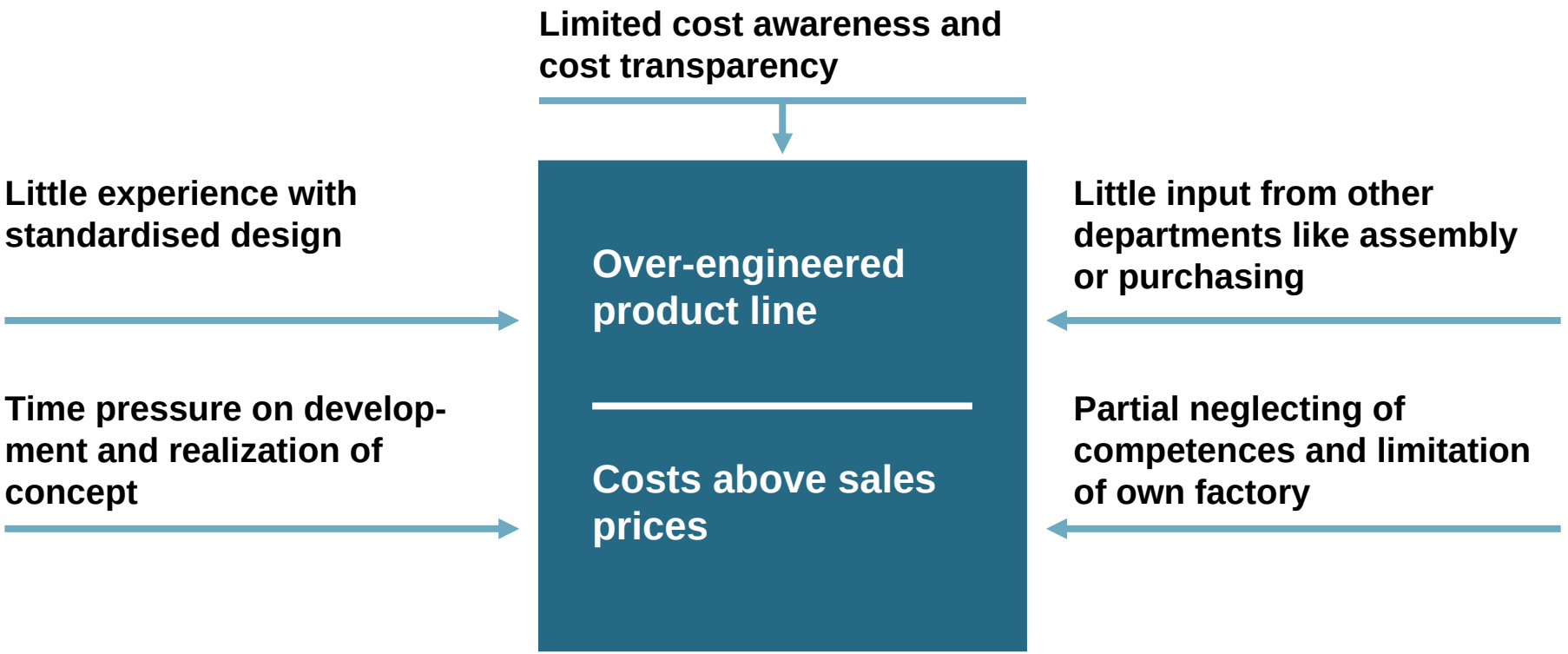
Existing product line in urgent need for replacement
- Development more than 20 years ago
- Limited flexibility of design concept
- Low degree of modularity and standardisation

NEW CONCEPT

- Modular design
- High process flexibility
- Low investment cost for customers
- Economic operations through short cycle time

Limited cost awareness and neglection of inputs from other departments led to a design concept that was heavily over-engineered

Reasons for failure of first design concept



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A comprehensive value analysis program was initiated to reduce manufacturing cost by at least 10%

Value analysis approach

GOALS

- **Understand the cost structure and cost drivers**
- **Design a machine that suits the requirements of the customer – but not more**
- **Reduce manufacturing cost by at least 10%**

APPROACH

Transparency and Controllability

- Analyse impact on Income Statement for every measure and focus on measures that reduce costs
- Set up a controlling system that tracks implementation and effect on Income Statements

Further standardization and modularization

- Increase number of similar components in different machine types
- Further limit the range of options for the customers

Broad involvement

- Include input from internal departments (production, assembly)
- Bring in ideas from external parties (customers, suppliers)

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Bottom-up validation of the targeted savings was done after transparency of costs was enabled and cost drivers identified

Value analysis process

COST ANALYSIS

- Total production costs per machine size were split up in material and labor (production, assembly, ...) and assembly group (basement, sliding bed, enclosure, ...)
- Main drivers of complexity were defined

→ **Create transparency**

TOP-DOWN TARGETING

- Machine types with similar characteristics were grouped
- Total target (>10% of manufacturing costs) was broken down into different assembly groups

→ **Decide on focus**

BOTTOM-UP VALIDATION

- Workshops were held to create ideas of implementation
- Savings, costs and feasibility were evaluated for every idea
- For every idea the decision was made whether to implement

→ **Define measures**

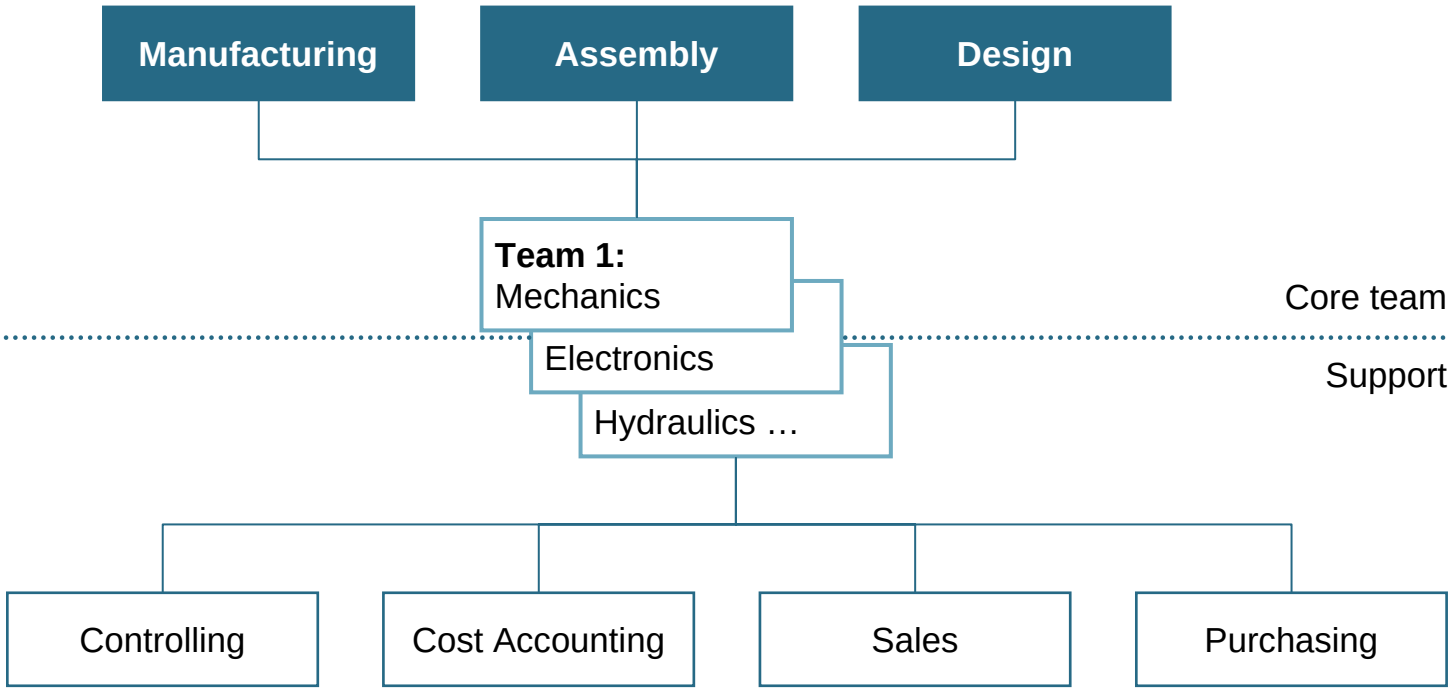
MEASUREMENT/ MANAGEMENT

- Responsibilities and time frames for every idea were defined
- Every measurement was recorded in the RBpoint software
- The realization was regularly tracked with the help of Jour Fixe meetings and the RBpoint software

→ **Control implementation**

Ideas to realize the savings target were defined, analysed and evaluated in regular workshops by mixed teams

Organization of workshops



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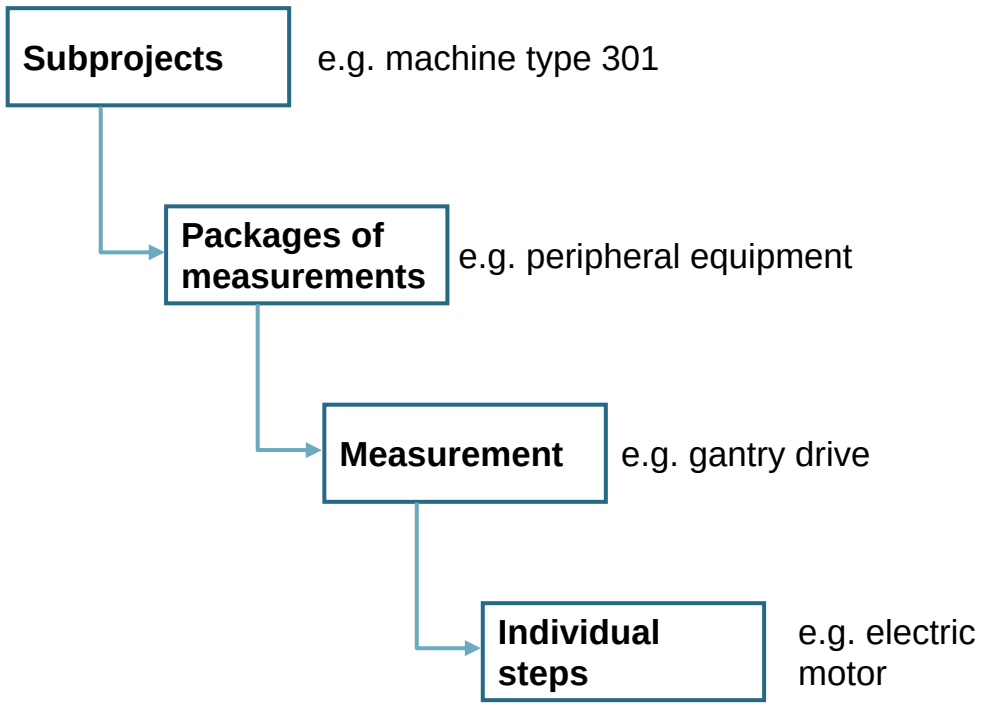
Every measure was recorded in the RBpoint software – aggregation enabled concise reporting

Structure of measurement management software

Structure



Description of individual step

Name:	Electric motor
Description:	Use NCU with reduced power for Siemens NC-control: check suitability, negotiate new equip-ment, change documentation
Responsible:	Anton Steger
Time frame:	July 7th – Oct 1st
Savings/ machine:	EUR 530,-
Aadditional cost:	0

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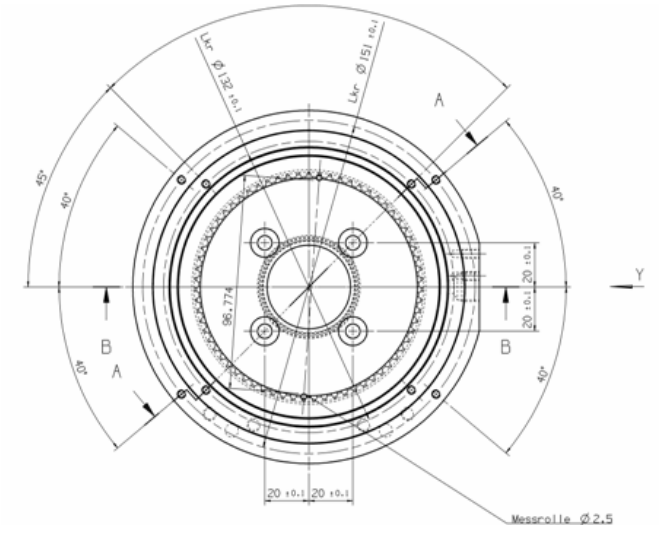
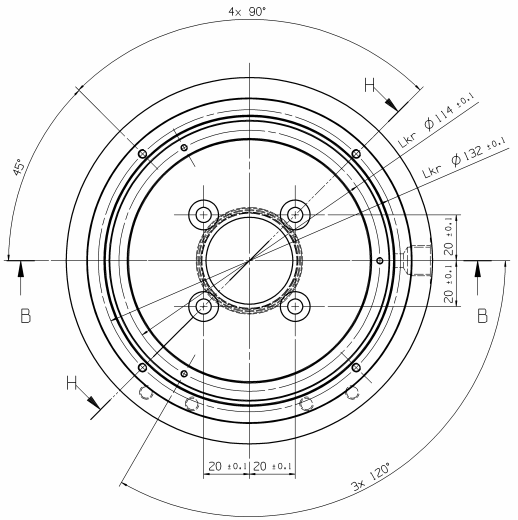
The connection between a housing and a shaft was changed from internal gearing to shrink fit

Example 1

ORIGINAL



REDESIGNED



Savings in manufacturing: 3h/unit

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The covers of the hydraulic unit were eliminated for machines sold to South America

Example 2

ORIGINAL

REDESIGNED

Savings in material: EUR 650/unit
Savings in assembly: 5h/unit

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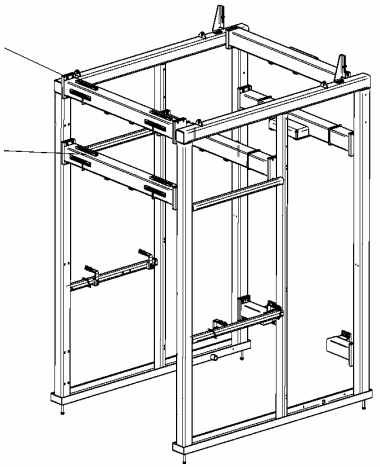
The frame of the loading device was completely redesigned and is now sourced as one single piece

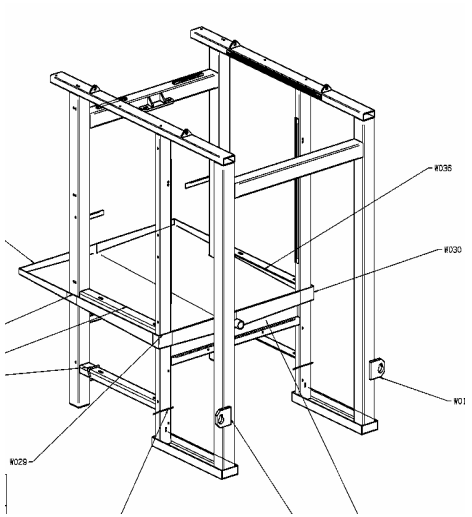
Example 3

ORIGINAL



2 frames welded together and then mechanically treated

REDESIGNED



device only welded, no mechanical treatment necessary, tray included

Savings in material: EUR 4.800/unit
Savings in manufacturing: 36 h/unit

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The guidings for piping above the machine were drastically simplified

Example 4

ORIGINAL

REDESIGNED

Savings in material: **EUR 4,500 for 1 line (=24 stations)**
Savings in assembly: **72 h for 1 line (=24 stations)**

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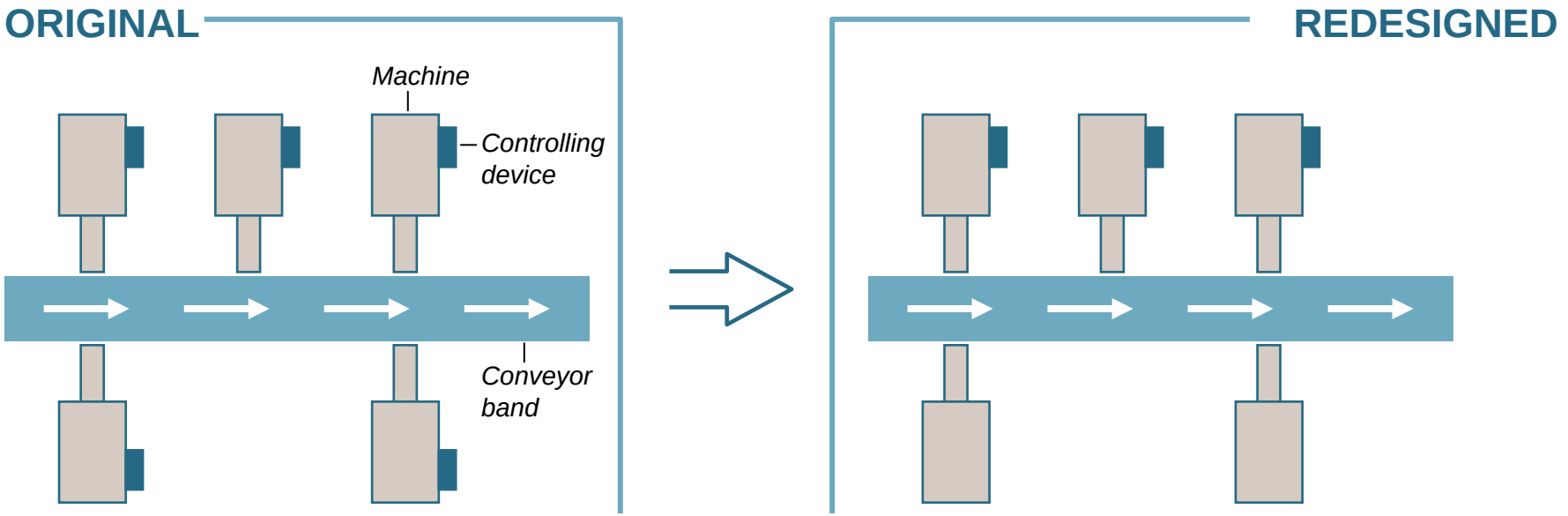
The number of controlling devices was reduced by installing only one device for opposite stations of a line

Example 5



5 controlling devices
1 devices controls 1 station

3 controlling devices
1 device controls 1 or 2 stations

Savings in material: **EUR 79,200 for 1 line (=24 stations)**
Savings in assembly: **80 h for 1 line (=24 stations)**

eventuell Seite 9 des Konzeptes zur Kostenträgerrechnung einfügen

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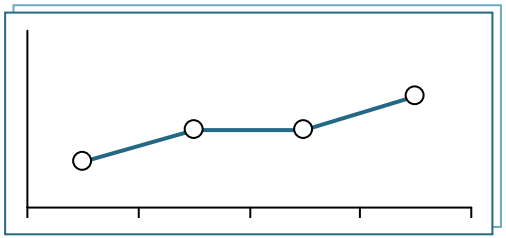
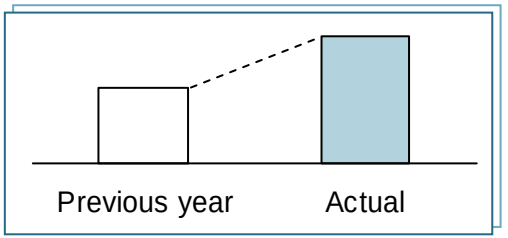
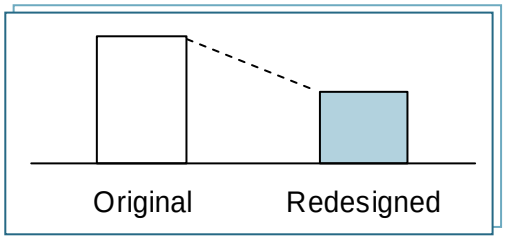
The implementation of the measures was tracked as well as the actual monthly impact on the Income Statement

Controlling of impact on Income Statement

DIMEN-SIONS

Measure 1.3.5. Electric Motor	August 2005	Machine type 301
		
Time/Implementation	Units sold per month	Cost per unit

I/S for month x

TASKS

• Permanent update of imple-mentations by people in charge • Additional controlling by management • Regular coordinating meetings	• Tracking of actual numbers of units sold per machine type • Comparison of previous volume and mix with actual data	• Repeated calculation of manufacturing cost per machine type

TOOLS

RBpoint	Controlling Sheet	Controlling Sheet

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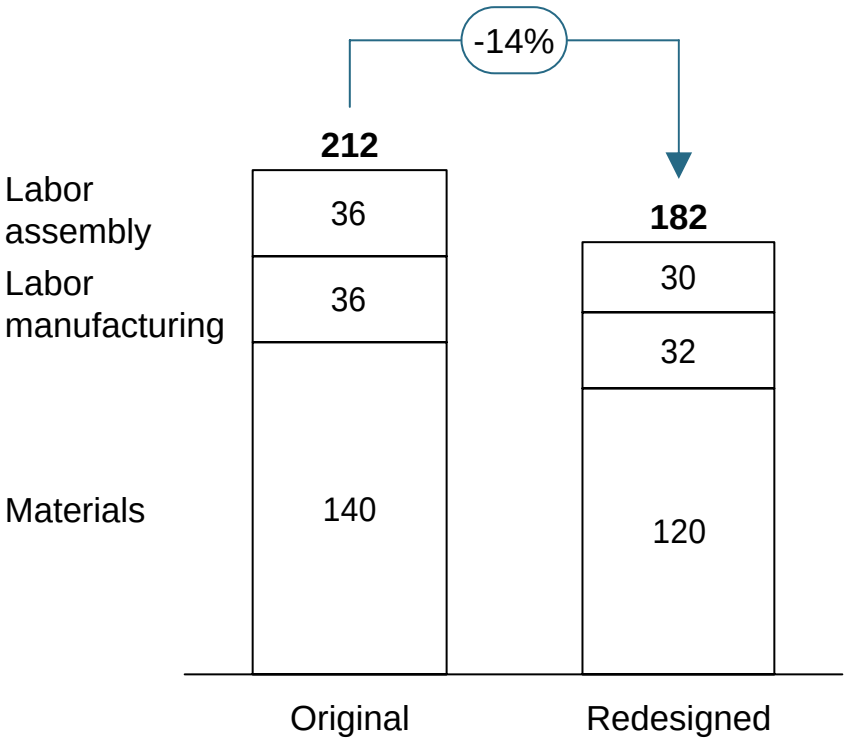
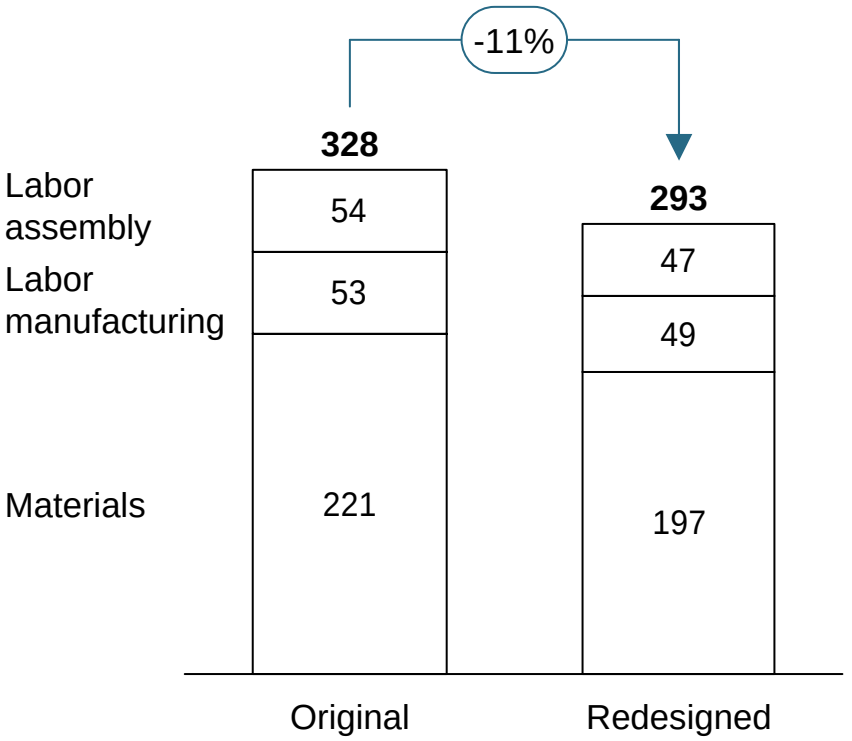
The different types and sizes of the redesigned machine series were between 10% and 15% cheaper than the original ones

Results of Design-to-Cost

Production cost machine type A [TEUR]



Production cost machine type B [TEUR]



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To guarantee savings in labor, additional measures have to be defined

Lessons learned

Key lessons	Elaboration
DESIGN-TO-COST BY ITSELF WILL NOT REDUCE LABOR COSTS	In order to benefit from the potential savings in labor hours, you have to define additional measures: • reduce and track overtime and/or • reduce number of temporary and/or fixed employees People tend to forget about these additional measures
LIMIT THE TIMEFRAM FOR CONCEPT-TUAL PHASE	Engineers will keep coming up with new ideas, still at one point you have to make a cut and start the implementation – define the timing of this cut in advance
STICK TO THE STANDARD	Moving from individual solutions to standard requires rethinking. Once you have defined a standard, do not immediately come up with the next specificiation. Better produce a significant number of machines, learn and collect ideas.

Source: Roland Berger