

DISCOVER HIDDEN POTENTIAL IN YOUR PRODUCTS: A CASE STUDY OF CONSUMER HOME APPLIANCE

The forth industrial revolution is making the world of manufacturing move at increasing pace. Product designers and process engineers are challenged with continuous innovation, process optimization and efficiency. These are keys to gaining competitive edge at manufacturing business.

At Bossard and KVT-Fastening we enable you to outstrip the competition by discovering the hidden potential of your products and bringing the benefits to light.



DISASSEMBLE THE PRODUCT AND ANALYZE EACH PART AND FASTENER



CONSULT THE EXPERTS TO FIND IMPORVEMENT PROPOSALS AND ESTIMATE THE INITIAL SAVING






VERIFY THE PROPOSALS AND EXAMINE THE ASSEMBLY PROCESS

KVT-Fastening is an expert for high-quality, special fastening applications and offers engineering solutions based on the wide product portfolio of the leading manufacturers in the market.



CONTENT

	DISASSEMBLE THE PRODUCT AND ANALYZE EACH PART AND FASTENER	(3)
	A CASE STUDY OF HOME COFFEE MACHINE	(3)
	CONSULT THE EXPERTS TO FIND IMPORVEMENT PROPOSALS AND ESTIMATE THE INITIAL SAVING	(3)
	EXAMPLE 1. IMMEDIATE COST-SAVING OPPORTUNITY	(4)
	EXAMPLE 2. POTENTIAL COST-SAVING OPPORTUNITY	(5)
	EXAMPLE 3. QUALITY CONCERNS	(6)
	TOTAL COST SAVING CALCULATION	(7)
	VERIFY THE PROPOSALS AND EXAMINE THE ASSEMBLY PROCESS	(8)
	FROM MATERIAL TESTING TO DAMAGE ANALYSIS	(8)
	DIGITAL TRANSFORMATION OF YOUR ASSEMBLY LINE	(9)



DISASSEMBLE THE PRODUCT AND ANALYZE EACH PART AND FASTENER: A CASE STUDY OF HOME COFFEE MACHINE

Fasteners due to their low price tend to be neglected in cost-saving considerations. However when you understand the Total Cost of Ownership for fasteners and think of home appliances being produced in enormous quantities, it turns out, that significant savings can be achieved.

To find out the optimizing potential of an existing automatic coffee machine on the market, a well-known brand of the automatic coffee machine was disassembled into its single parts and fasteners.

Each part and fastener are carefully examined by its functionality and quality and their respective cost-saving potential and possible improvements are measured and proposed. In a home appliance as simple as a coffee machine, the following is discovered.

- 16 assembly groups
- 112 fasteners were found and identified
- 31 types of fastening elements were differentiated (17 screws, 7 washers, 2 nuts, and 5 others)

WHY ARE WE DOING THIS?

The aim is to uncover the hidden potential and bring the benefits to light. Possible benefits can be: process optimization, increase in efficiency, complexity reduction, design security, quality improvement, cost reduction, etc.



CONSULT THE EXPERTS TO FIND IMPORVEMENT PROPOSALS AND ESTIMATE THE INITIAL SAVING

After the product is completely disassembled, the cost of each part and fastening element is calculated based on the Total Cost of Ownership (TCO). With the specific know-how of KVT-Fastening, each fastening is analyzed and compared with the possibly better solution.

12 optimization proposals were made:

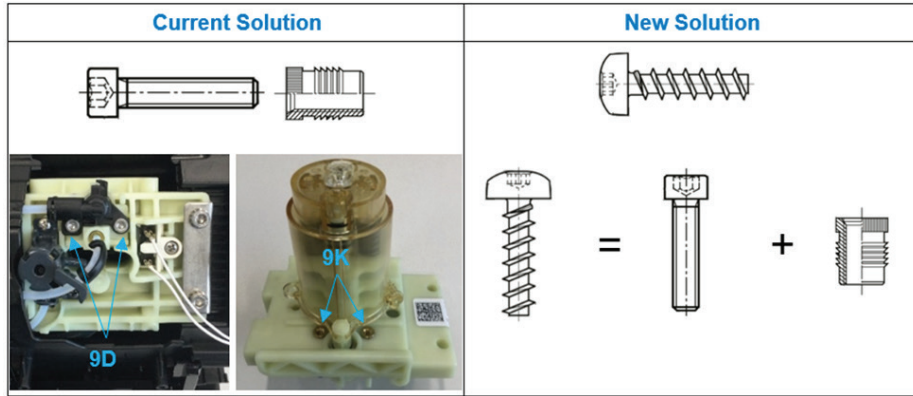
- 4 immediate cost-saving opportunities
- 4 potential cost savings
- 3 quality concerns
- 1 potential cost saving with the future design change

EXPERT TEARDOWN SERVICE 



EXAMPLE 1. IMMEDIATE COST-SAVING OPPORTUNITY

The brewing assembly is attached to the coffee machine with screws, washers and nuts. The further screws (9D) are fastening smaller elements to the brewing assembly group. Because of direct or possible contact with water, stainless steel fastening elements were used. Joint assessment 9 is one of two assessments, where metric screws occur.



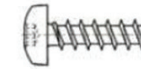
EXPERT TEARDOWN SERVICE

9D & 9K- Brewing assembly

Current Solution



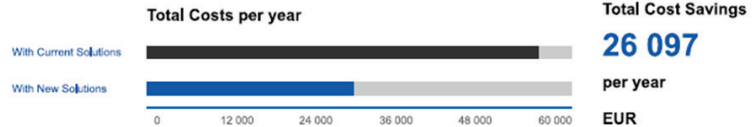
New Solution



Metric screw + press-in threaded insert

ecosyn®-plast

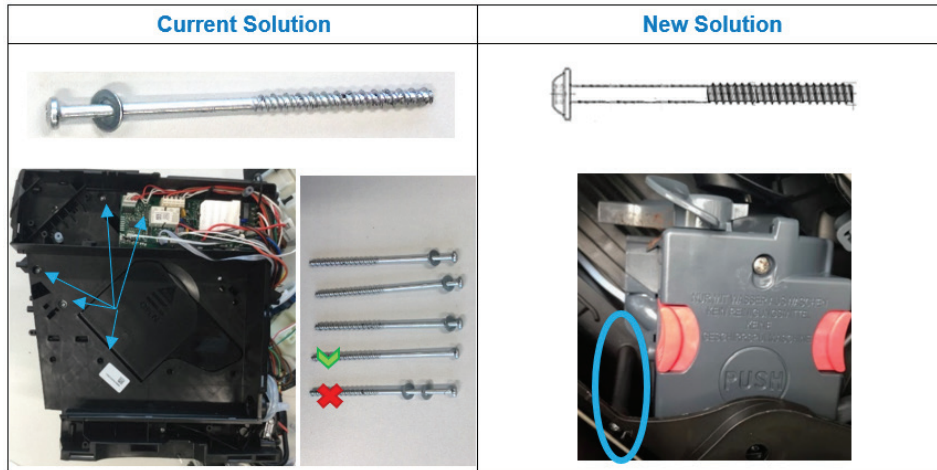
Quantity of Fastener per year	600 000	pcs	600 000	pcs
Price of Fastener (per 100 pcs)	6,00	EUR	2,72	EUR
	Moulded/Die-cast Hole		Moulded/Die-cast Hole	
Preparation Time per fastener	0,0	seconds	0,0	seconds
Installation Time per fastener	15,0	seconds	10,0	seconds
Process Time per year	2 500,0	hours	1 666,7	hours
Labour Rate (per hour)	7,70	EUR	7,70	EUR
Process Cost per year	19 250	EUR	12 833	EUR
Fastener Cost per year	36 000	EUR	16 320	EUR
Cost per year	55 250	EUR	29 153	EUR
Total Cost per year	55 250	EUR	29 153	EUR
Total Cost Savings per year			26 097	EUR





EXAMPLE 2. POTENTIAL COST-SAVING OPPORTUNITY

The inner walls – the wall with infuser door and the wall with transmission unit are assembled with seven screws (15B). The HiLo screws occur with washers (15C), except for the screw behind the infuser door, where there is no space for a washer.



EXPERT TEARDOWN SERVICE 

15B & 15C- Inner walls

Current Solution



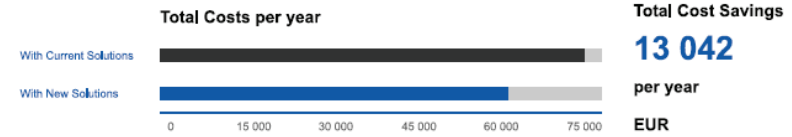
HiLo screw
Washer

New Solution



ecosyn@-plast with flange

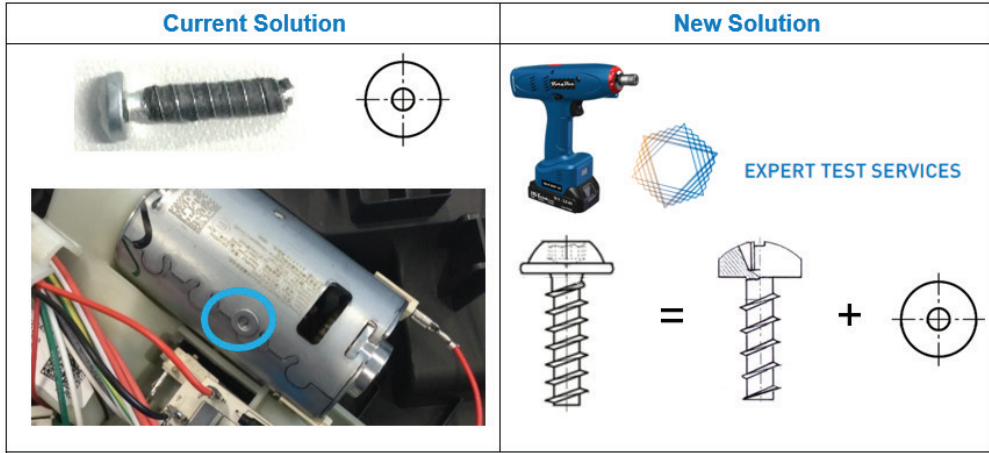
Quantity of Fastener per year	1 500 000	pcs	1 500 000	pcs
Price of Fastener (per 100 pcs)	1,60	EUR	1,80	EUR
	Moulded/Die-cast Hole		Moulded/Die-cast Hole	
Preparation Time per fastener	0,0	seconds	0,0	seconds
Installation Time per fastener	15,0	seconds	10,0	seconds
Process Time per year	6 250,0	hours	4 166,7	hours
Labour Rate (per hour)	7,70	EUR	7,70	EUR
Process Cost per year	48 125	EUR	32 083	EUR
Fastener Cost per year	24 000	EUR	27 000	EUR
Cost per year	72 125	EUR	59 083	EUR
Total Cost per year	72 125	EUR	59 083	EUR
Total Cost Savings per year			13 042	EUR





EXAMPLE 3. QUALITY CONCERNS

In the area of transmission unit one loosened screw was found and one additional washer was lying on the motor. A reason for the loosened screw can be that the wrong (too high) tightening torque was applied. Another possibility is that the screw and washer belong together, but the worker forgot to place the washer during the assembly process. The right tightening torque was applied, but there was different head friction and in the result the screw torn the base material out.



EXPERT TEARDOWN SERVICE



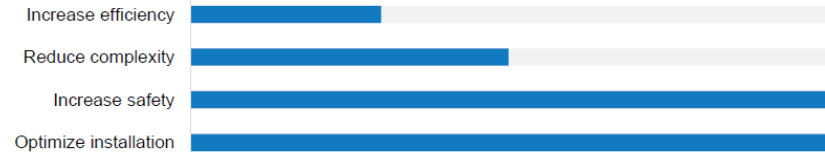
Proposals

1) Screw- in tests and analysis in Bossard laboratory and recommendation of correct installation parameters. 2) Precise control of the tightening torque by a smart tool. 3) Using a multifunctional screw with a flange.

Reason

100% prevention of screw failure.

Areas of potential improvement





TOTAL COST SAVING CALCULATION

The cost-saving estimation is based on **Total Cost of Ownership (TCO)** principle. The TCO is the purchase price of the part plus the costs of the operation, which reflects the best the true value of a single part.

Total Cost of Ownership analysis was done for 12 improvement proposals based on the following assumptions:

- quantity of coffee machines per year – 300.000 pcs.
- prices of fasteners – according to best knowledge about market prices and considerin past requests for quotation from a well-know coffee machine manufacturer
- process time for current and new fastening solutions - according to best practice
- labor rate per hour in an eastern european country – € 7,70/hour (according to Eurostat)

Value Analysis			
	Current	New	
Project TCO per year	230.075 €	172.621 €	
Project TCO savings per year	57.454 €		or 25% of current cost
Fastener spend per year	89.550 €	80.220 €	
Fastener spend change per year	9.330 €		or 10% decrease from current spend
Process time per year	18.250 hours	11.999 hours	
Process time savings per year	6.251 work-hours		or 34% of current work-hours
Labour savings per year	3,7 FTE headcounts		

(7)

**SAVE UP
TO 34%
OF THE
ASSEMBLY
TIME**



VERIFY THE PROPOSALS AND EXAMINE THE ASSEMBLY PROCESS

Testing and verification of the improvement proposals is necessary to ensure the success of the alternative solutions. For the verification, Bossard and KVT-Fastening provide the physical samples and verify the proposed improvements either on-site at your production line or in Bossard's accredited laboratory.

FROM MATERIAL TESTING TO DAMAGE ANALYSIS

With a vast array of testing options, we can handle our customers' versatile product range with ease. By continuously expanding our testing methods to include standardized procedures, we are always in tune with the latest developments and can offer you state-of-the-art technology.

An overview of the most common testing procedures and further details can be found here:

- [Spectral analysis](#)
- [Friction coefficient test](#)
- [Torque analysis](#)
- Loosening analysis
- Tensile and compression strength testing
- Corrosion analysis (Salt spray test, Kesternich test)
- Ultra-sonic preload measuring
- Hardness test/hardness profile measurement
- Coating thickness measurement

EXPERT TEST SERVICE



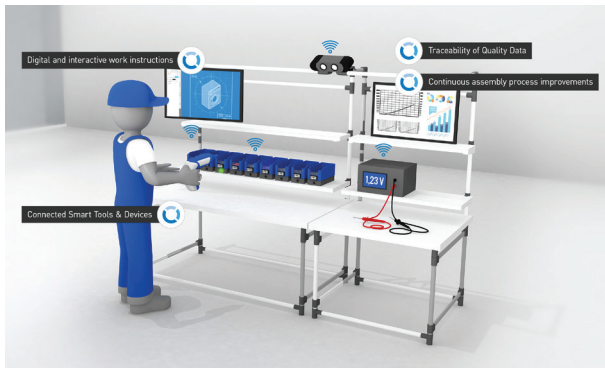


After the optimization of the fasteners in the product, it is time to look at the complete assembly process to tackle even more optimizing potential. The leaner the process, the better – this is common sense for every manufacturer. But how do we start to make the assembly line leaner?

DIGITAL TRANSFORMATION OF YOUR ASSEMBLY LINE

First of all, we need to consider the key elements of assembly process optimization. The number of assembly steps, time of each assembly step, the frequency of error, the automated degree of the workflow, etc all contribute to the efficiency of the assembly process and the assembly quality.

We suggest using a digitized assembly line that provides the standardized workflow, real-time documentation, and connected smart-tool to ensure quality consistency.



Smart Factory Assembly is the solution of digitizing the assembly line to increase the process reliability and productivity, which reduces production costs in manufacturing. It not only provides digital and interactive work instruction and connected smart tool and devices for the worker to follow easily, it also documents the complete production data, which allows the traceability of the quality data and the continuous process improvements. Data transparency is valuable and incredibly helpful for the production manager to analyze and implement improvement easily and quickly.

SMART FACTORY ASSEMBLY



**WOULD YOU LIKE TO KNOW MORE ABOUT
HOW YOU CAN DISCOVER THE HIDDEN
POTENTIAL OF YOUR PRODUCT?**

You know now the rough steps to tackle the hidden potential of your products. You are welcome to come to us with your product and let us discuss the concrete steps with you.

CONTACT US NOW