ROBUST STANDARDISATION OF COMPONENTS

A CASE FROM A LEADING AUTOMOTIVE SUBSUPPLIER

September 2016
DR. SCHNEIDER

3600 EMPLOYEES MAKING THE CAR THE BEST PLACE IN THE WORLD.

THE DR. SCHNEIDER NAME STANDS FOR INNOVATIVE PRODUCTS, OUTSTANDING QUALITY, RELIABILITY AND A SENSE OF RESPONSIBILITY. WE CALL IT: "EXCELLENCE IN PLASTICS."
DEMANDING CUSTOMERS IN A COMPETITIVE MARKET

Audi, BMW, Chevrolet, Citroën, Ferrari, Fiat Chrysler, Ford, GM, Honda, Jaguar, Kia, Lamborghini, Land Rover, Maserati, Maybach, Mazda, McLaren, Mercedes Benz, Mini, Mitsubishi, Opel, Peugeot, Porsche, Renault, Rolls Royce, Seat, Škoda, Smart, Toyota, Volvo und VW.
MARKET DEMANDS AND INTERNAL WORK FLOW ISSUES

COST OF QUALITY COMPETITION
TIME TO MARKET
CUSTOMISED PRODUCTS
ZERO DEFECTS FIRST SAMPLES

INNOVATION HEIGHT
DEVELOPMENT CYCLES
TRIAL-AND-ERROR PROBLEM-SOLVING
QUALITY VARIATION
NARROW COMPONENT TOLERANCES
REUSE SURPRICES
MANY COMPONENTS WITH RAMP-UP ISSUES

29% OF TOTAL SURFACE AREA IS HIGHLY CRITICAL FOR FUNCTION
PRODUCT AND COMPONENT ARCHITECTURE HAVE MANY UNNECESSARY DESIGN WEAKNESSES

<table>
<thead>
<tr>
<th>RANKING</th>
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NARROW **COMPONENT TOLERANCES** ON THE LIMIT OF ACHIEVABLE
INNOVATION HEIGHT IS CHALLENGED

PRODUCT DESIGN

UNEXPLAINABLE WEAR

VARIATION FROM BATCH-TO-BATCH

LONG RAMP-UP TIMES

NOISE AND VIBRATIONS

MARKET LAUNCH
TIME CONSUMPTION DESIGNING AND WORK FLOW TYPE

TRIAL-AND-ERROR-BASED WORK FLOW

ANALYSING AND TESTING DESIGN

RIGHT-FIRST-TIME-BASED WORK FLOW

CREATING DESIGN
DR. SCHNEIDER DESIDES TO LAUNCH A "RIGHT-FIRST-TIME" TRAINING PROGRAMME IN THE ENTIRE ORGANISATION.
MAIN FOCUS IS ON THE DEVELOPERS CREATING THE DESIGN.
OBJECTIVE OF THE TRAINING PROGRAMME

TRIAL-AND-ERROR-BASED WORK FLOW

CREATING DESIGN

ANALYSING AND TESTING DESIGN

RIGHT-FIRST-TIME-BASED WORK FLOW

Six Theta® design
TIME LINE AND DEFINED GUIDING STARS

2016
Lifting create design skills

2017
Adapt optimal work flow

2018
Robust standardisation "RIGHT-FIRST-TIME"

2019
PROJECT WORK AND “CREATE DESIGN” TRAINING ARE THE BACKBONE OF THE PROGRAMME
R&D, PROCUREMENT, PRODUCTION AND SALES ARE INVOLVED TO SUPPORT DESIGNERS.
PEOPLE AND DIFFERENT LEVELS OF “CREATE DESIGN” COMPETENCES
TRAINING PROGRAMME – LIFTING “CREATE DESIGN”
SKILLS PHASE

2016

LIGHHOUSE CASES

MANAGEMENT

SIX THETA® INTRODUCTION

SIX THETA® COMPONENT DESIGN

SIX THETA® PRODUCT DESIGN

SIX THETA® STANDARDISATION

IMPLEMENTATION SUPPORT
IMPACT ACCORDING TO DR. SCHNEIDER'S EMPLOYEES

1 Concept Development
2 Prototype Development
3 Series Development
4 Industrialization
5 Series Production
6 Aftermarket

Reduced Risk
Easier Development
Less Rework
Less Validation
Higher Quality
Reduced Cost
Faster Development
Potential for Standards
Better Concept Evaluation
Precise Communication
CRITICAL SURFACE REDUCTION

29% → 1%
NARROW TOLERANCE REDUCTION
## PRODUCT AND COMPONENT ARCHITECTURE WEAKNESSES REDUCED

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OTHER ACHIEVEMENTS

• New and patented geometrical solutions have been found
• Iterations of the first product launches were strongly reduced
• Up-front dialogues with customers and suppliers were improved
• Standardisation of component and product design for all departments were beginning with minimum coordination
• New product functionality has been developed. Customers said “We are very satisfied with the innovative ambition level and quality delivered”
AREAS GOING FORWARD

• Utilise production capability to lift product performance further while reducing cost

• Optimise balance between creating design and analysing design by adaption of workflow processes

• Develop and optimise company component, product and portfolio standardisation roles for design that will ensure a future modularised and agile product portfolio