DEVELOPMENT OF AN ENVIRONMENTAL
‘GREENER’ OPTAMID® DEFLECTION PULLEY

YOUR REQUIREMENT IS OUR CHALLENGE
TAILOR-MADE SOLUTIONS IN ENGINEERING PLASTICS

Date: 09/2017
PRESENTATION INTERLIFT 2017

OPTAMID® Green pulley development

HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE?

State: 10/2017
The intensified focus on energy, environment, sustainability and a positive influence of an ecologic footprint is trending in the elevator industry as well.

Elevator components have to follow this inevitable direction. Existing products and processes need to be adapted in design to be more eco-friendly.
In this presentation Schwartz presents their newest development by taking the example of the new product development called “Green Pulley” which exactly meets the trend. The weight optimized new design combined with lifetime greased bearings offers far-reaching ecological advantages. With the goal to reduce the eco footprint - naturally in combination with improved performance.

WHAT ABOUT YOUR CARBON FOOTPRINT?
OPTAMID® has been used over 40 years with excellent performance

The challenge: Develop an environmental greener pulley with higher value

How can we keep our high performance and quality level and create a greener pulley with a smaller CO₂ footprint and higher value for our customers?
INPUT IDEAS

HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE

- **REDUCE WEIGHT**
  - less material use
  - reduction raw material and energy usage

- **CLOSED BEARINGS**
  - less usage of grease in the system

- **NO GREASING SYSTEM**
  - less pollution in the shaft, less waste

- **MAINTENANCE FREE**
  - lower manpower requirement

- **REDUCE AMOUNT OF PARTS**
  - lower risk for failure
  - increase quality

- **CHANGE PULLEY DESIGN**
  - create more uniform deformation for improved ride comfort

- **CAPITALIZE ON OPTAMID®’S EXCELLENT MATERIAL PROPERTIES**
  - reduce material portion which does not contribute to stiffness
DESIGN A GREENER ALTERNATIVE WITH BETTER PERFORMANCE
HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE

RE-DESIGN

- Dynamic FEM on stress and deformation at slimmer re-design
- Compare with test results current design
- Adjust parameters to sync the results
- Calculate different basic concepts
- Analyze based on starting parameters and pick the best solutions
- Refine and optimize the models of the two best solutions
- Pick best solution and built molds
- Cast test series and improve mold based on results
- Cast proto-series and final deformation test
- Field test @customer if required
- Set production and quality procedures
- Documentation
- Ramp up
HOW TO REDUCE GREASE CONSUMPTION WITH LESS MAINTENANCE EFFORT
HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE

BEARING IMPROVEMENT AND REMOVAL OF GREASING REQUIREMENT

- By changing from branded bearing to STP bearings a quality step was made in combination with cost reduction.
- Bearings tested at Chinese and EU test houses with good results.
- Closed 6311 2RS bearings initial greased with high end stabilized grease.
- NBR seals to prevent dust and moisture entering the cavity’s
OUR RESULTS
OUR BASIC DESIGN
HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE

Weight of plastic parts: 6,2 KG
Amount of parts: 11
Grease system: with nipple, 2 screws, caps
Initial greasing: with 125 grams
Maintenance greasing: 150 grams each year
Maintenance time: 12 minutes each year
Design life time: 10 years

JUST TO REMIND YOU
THE NEW DESIGN
OPTAMID® PULLEY WITH SMALLER CARBON FOOTPRINT

Weight of plastic parts: 4,6 KG
Amount of parts: 6
Grease system: life time greased
Initial greasing: with 100 grams high end grease
Maintenance greasing: not required
Maintenance time for greasing: not required
Design life time: >10 years
Direct Cost Reduction

✓ 1,6 kg less material usage => approx. 10 €
✓ Reduction of grease usage in 10 years: 1,5 KG => 15 €
✓ Reduction of manpower in 10 years 2 hrs: => 80 €
✓ Reduction of waste cartridges, cleaning cloth with grease etc. => 7,50 €

✓ TOTAL COST REDUCTION PER PULLEY ➔ 112,50 Euro

✓ Reduction of environmental footprint
✓ Improved performance
GREENER
Lower material usage
No lubrication required
IMPACT GLOBAL WARMING AND ENERGY CONSUMPTION FOR MATERIALS

• PA6 Cast production / KG
  – Global Warming Potential (GWP) = 7.3 Kg CO₂ eq
  – Abiotic Depletion Potential (ADP) = 125.5 MJ

• Grease production / KG
  – Global Warming Potential (GWP) = 45 Kg CO₂ eq
  – Abiotic Depletion Potential (ADP) = 625 MJ
RESULTS OF ENVIRONMENT PROTECTING GREEN PULLEY PRODUCTION

With **36,000 units/year** the weight reduction is 57.6 tonnes PA 6 and 54.0 tonnes grease.

This equals the energy consumption of **40,979 Gigajoule = 540 House holds of 3 persons for one year!**

**CO₂** reduction = **2,860 tons CO₂ eq = 720 persons flying from Frankfurt to Shanghai and back**
THE BENEFITS AT A GLANCE:
OPTAMID® PULLEY WITH SMALLER CARBON FOOTPRINT

**GREENER**
- Lower material usage
- No lubrication required

**IMPROVED PERFORMANCE**
- Less inertia
- Less vibration through equalized deformation
- Increased ride comfort
- Improved Quality performance due to
  - Lower amount of parts

**COST REDUCTION**
- Lower total cost for production and assembly
- Lower grease consumption during maintenance
- Lower maintenance cost
HOW TO DEVELOP AN ENVIRONMENTAL GREENER PULLEY WITH HIGHER CUSTOMER VALUE?

Based on market knowledge, product know how and the drive for innovation:

ANALYSE
UNDERSTANDING
REALIZE
ANY QUESTIONS?

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