



DEVELOPMENT OF AN ENVIRONMENTAL '**GREENER**' OPTAMID® DEFLECTION PULLEY

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



SCHWARTZ
TECHNICAL PLASTICS

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 FOOT PRINT 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

	90	20	1.1	35.00	23.20	7,100	4,700	5,700	8,300	6210	210
	110	27	2	62.00	38.50	6,400	4,200	5,000	7,500	6310	310
	130	31	2.1	83.00	49.50	5,700	—	—	6,700	6410	410
55	72	9	0.3	8.80	8.10	8,700	4,800	—	10,000	61811	10008
	80	13	1	16.00	13.30	8,200	4,600	—	9,600	61911	10009
	90	11	0.6	18.60	15.30	7,700	—	—	9,000	16011	70001
	90	18	1.1	28.30	21.20	7,700	4,500	—	9,000	6011	111
	100	21	1.5	43.50	29.20	6,400	4,300	—	7,600	6211	211
	120	29	2	71.50	45.00	5,800	3,900	—	6,800	6311	311
	140	33	2.1	89.00	54.00	5,200	—	—	6,100	6400	411
60	78	10	0.3	11.50	10.60	8,000	4,400	—	9,400	61812	10008
	95	12	1	16.40	14.30	7,500	4,200	—	8,800	61912	10009



OUR RESULTS



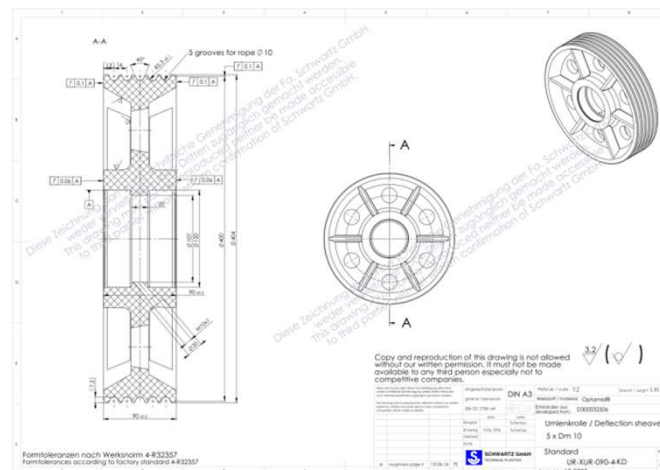
JUST TO REMIND YOU



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



OUR RESULTS



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





SAVING MONEY

OPTAMID® PULLEY WITH SMALLER CARBON FOOTPRINT

- ✓ **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 €

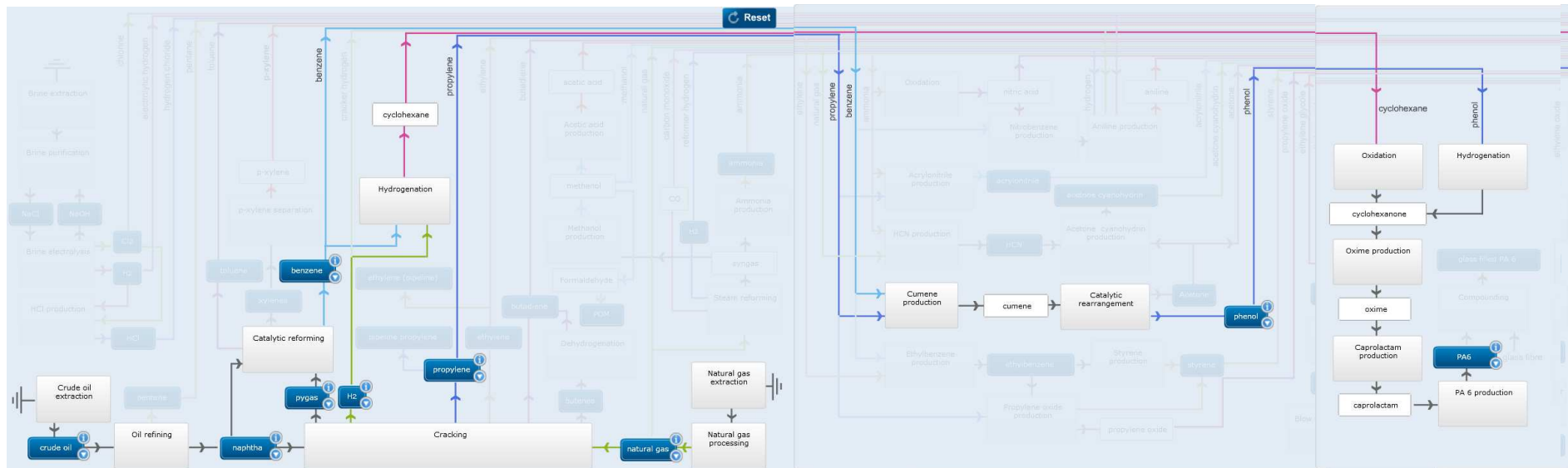
✓ **TOTAL COST REDUCTION PER PULLEY → 112,50 Euro**

- ☐ 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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