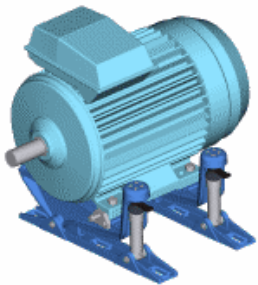


GEMEX



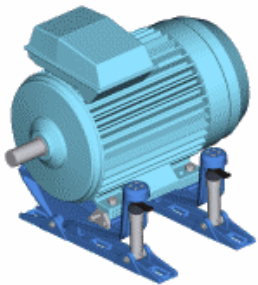
PROGRAMME

- Problems with actual installations
- Gemex: components and methods
- The advantages of Gemex
- Practical examples
- Special applications with Gemex-solutions



PROGRAMMA

- Gemex: cost-benefit analysis
 - Energy
 - Comfort – productivity – safety
 - Longevity
 - Production stop

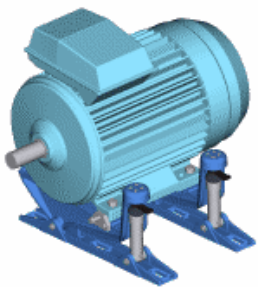
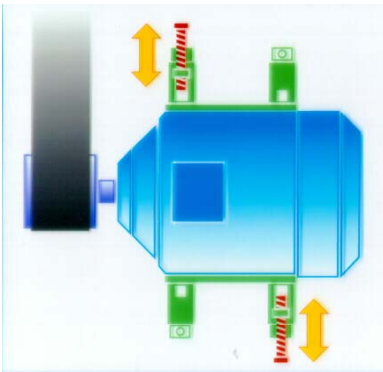


TRADITIONAL INSTALLATIONS

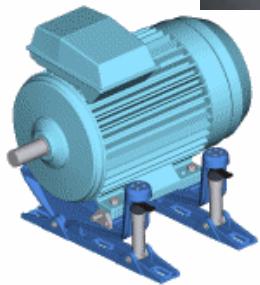
Actual situation:

The motor is placed on tension rulers.

For topmounted or vertically mounted drives some kind of an adjustable shelf is common.



TRADITIONAL INSTALLATIONS

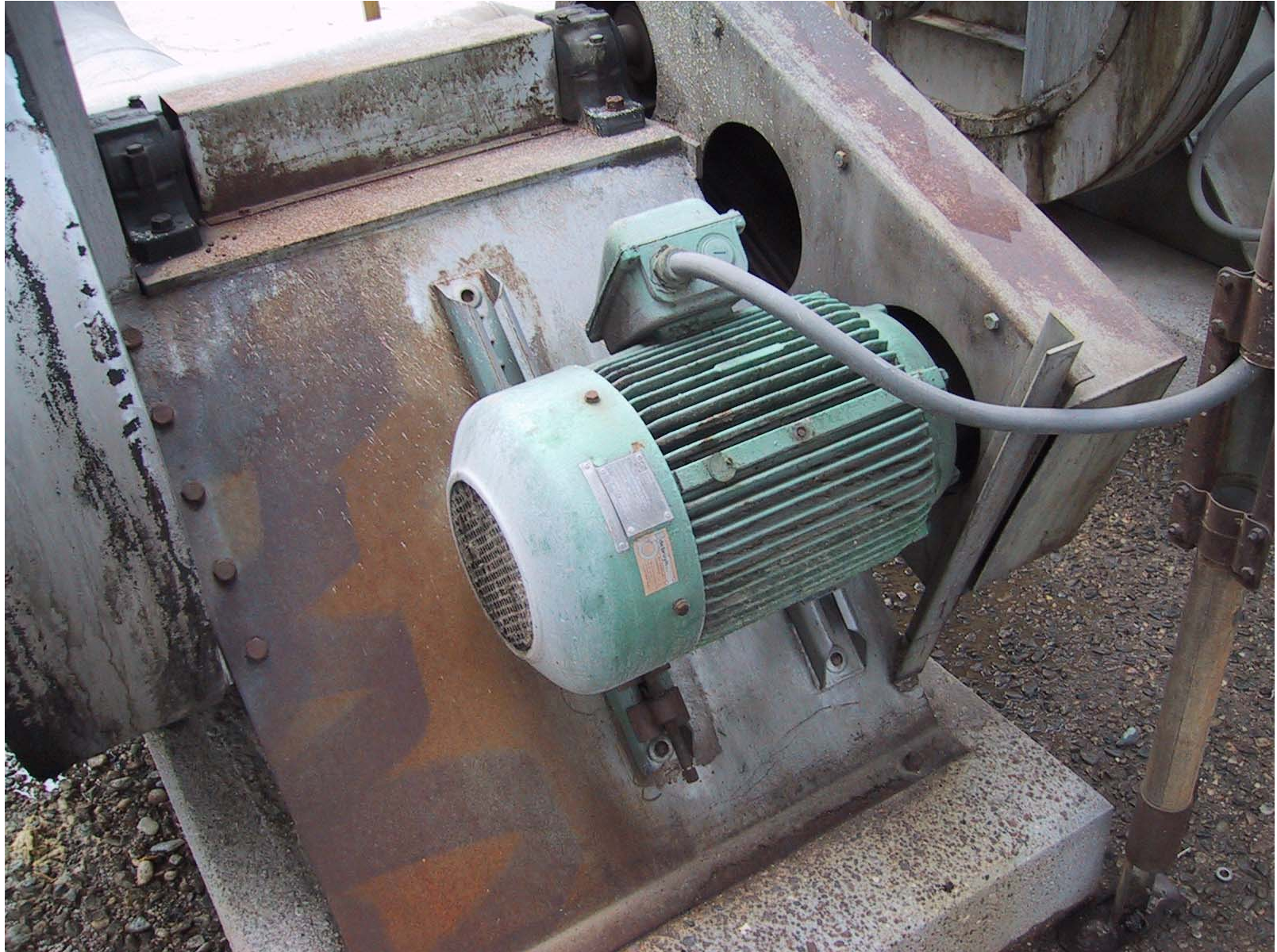




CORRODED TENSION RULERS



ADJUSTABLE SHELF WITH TENSION RULERS



HANGING SHELF



ADJUSTABLE SHELF WITH VERTICAL TENSION RULERS



VERTICALLY ADJUSTABLE SHELF

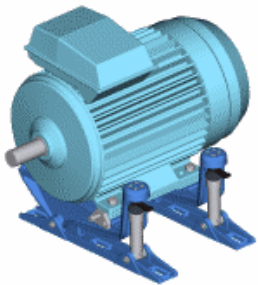
TRADITIONAL INSTALLATIONS

Actual situation:

It is generally stated that well maintained belts with correct alignment and tension has a lifespan of 25 000 runtime hours. The theoretical efficiency is 97%.

Life span in practice!

- 30% has a life span of less than 5 000 hours.
- 50% has a life span of 5000-12 500 hours.
- 20% has a life span of 12 500 hours or more.

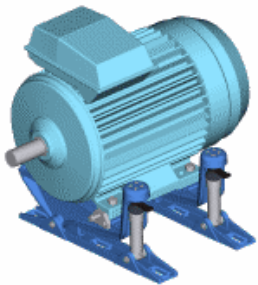


TRADITIONAL INSTALLATIONS

Premature belt wear – decreased efficiency

Causes:

Incorrect alignment,
wrong belt tension,
accessibility,
belt slips,
priority of production,
corrosion,
etc.





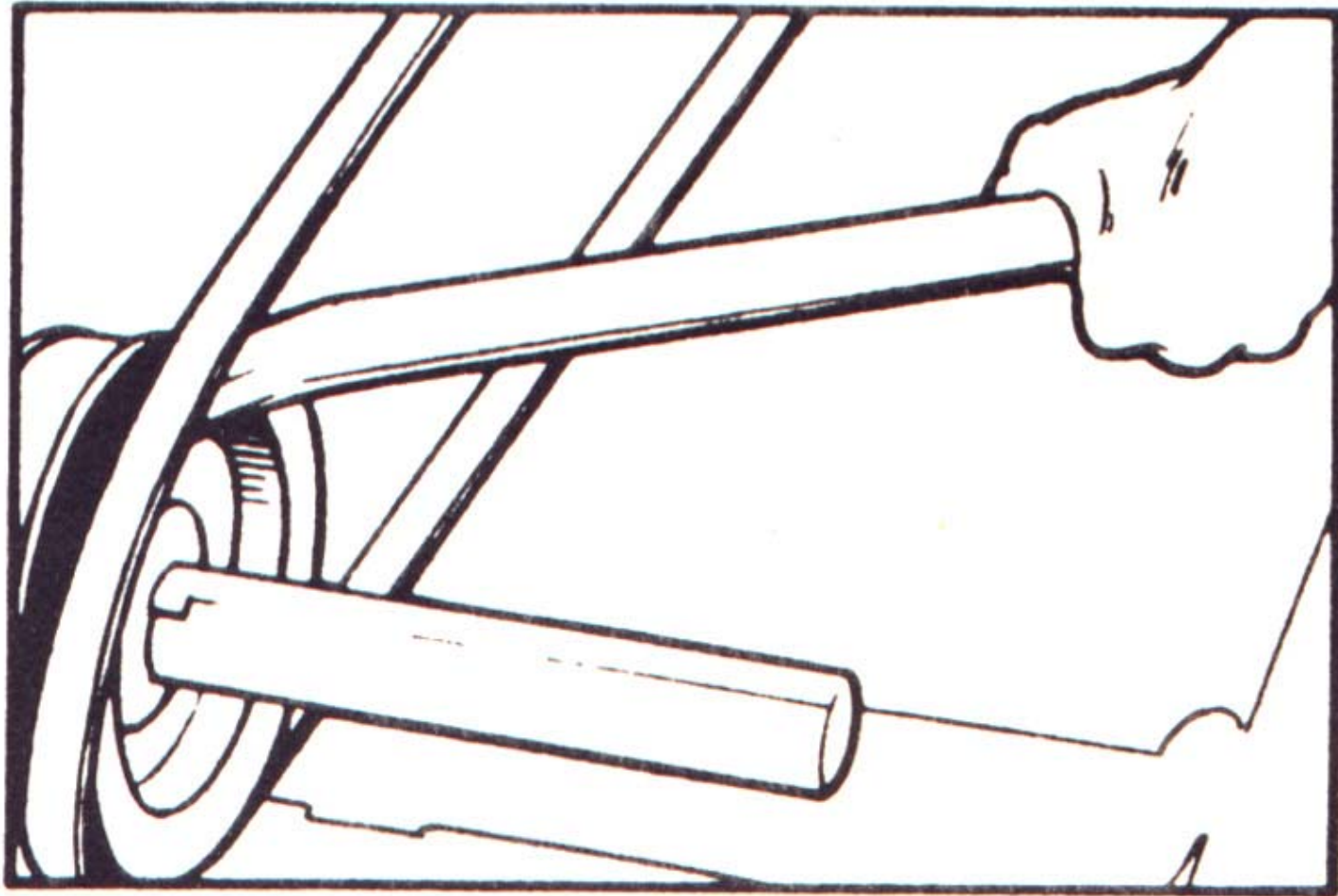
INCORRECT BELT TENSION AND ALIGNMENT



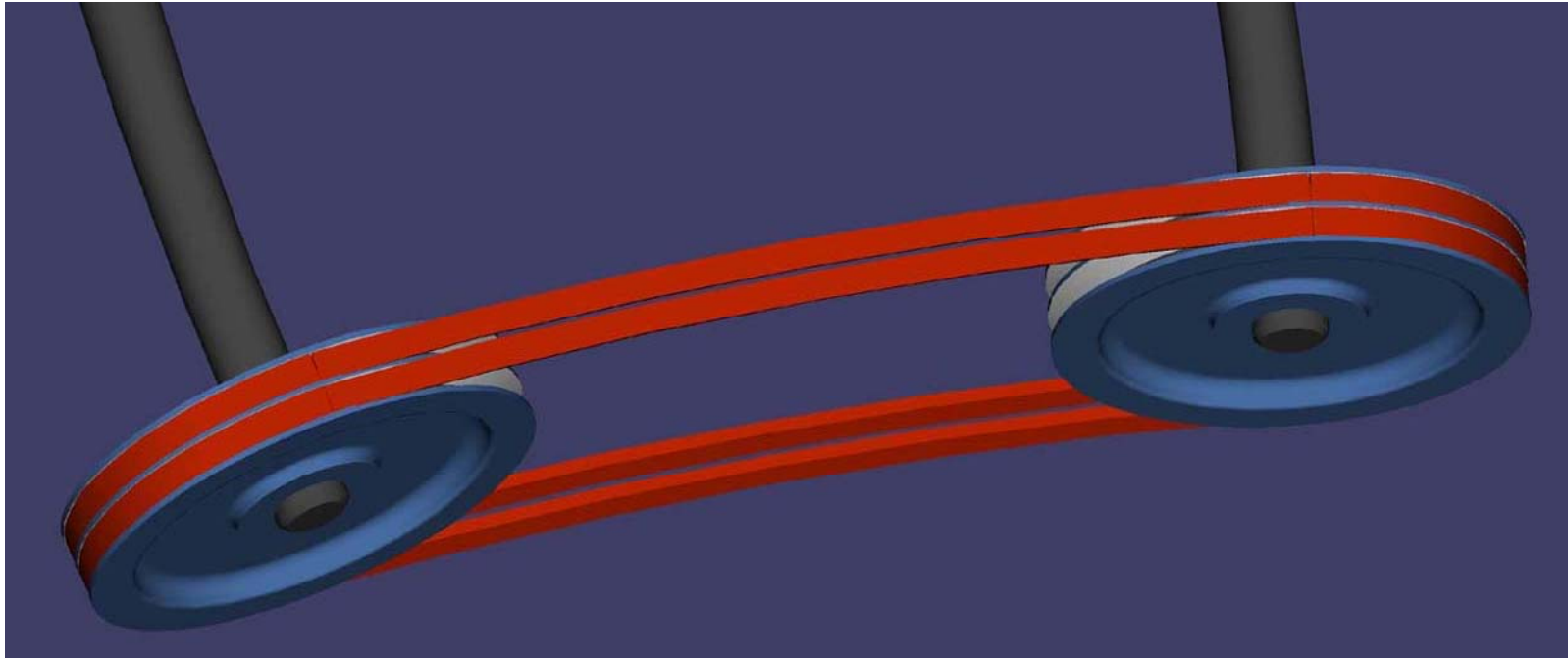
ACCESSIBILITY



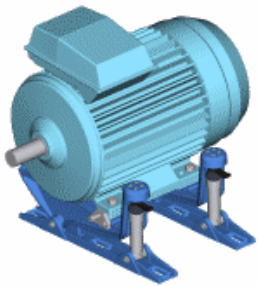
CORROSION



TRADITIONAL WAY OF REPLACING THE BELTS:
A CROWBAR



The shafts will bend due to an overdue of belt tension

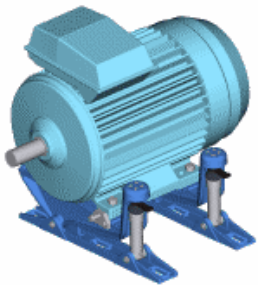




THE GEMEX METHOD

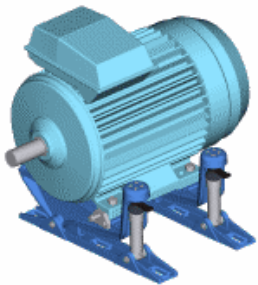
- **THREE COMPONENTS:**

- a shelf, onto which the motor is placed
- one or two hydraulic cylinders, installed on the shelf
- a hydraulic pump with a manometer

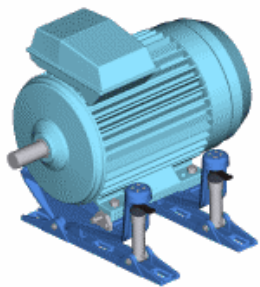
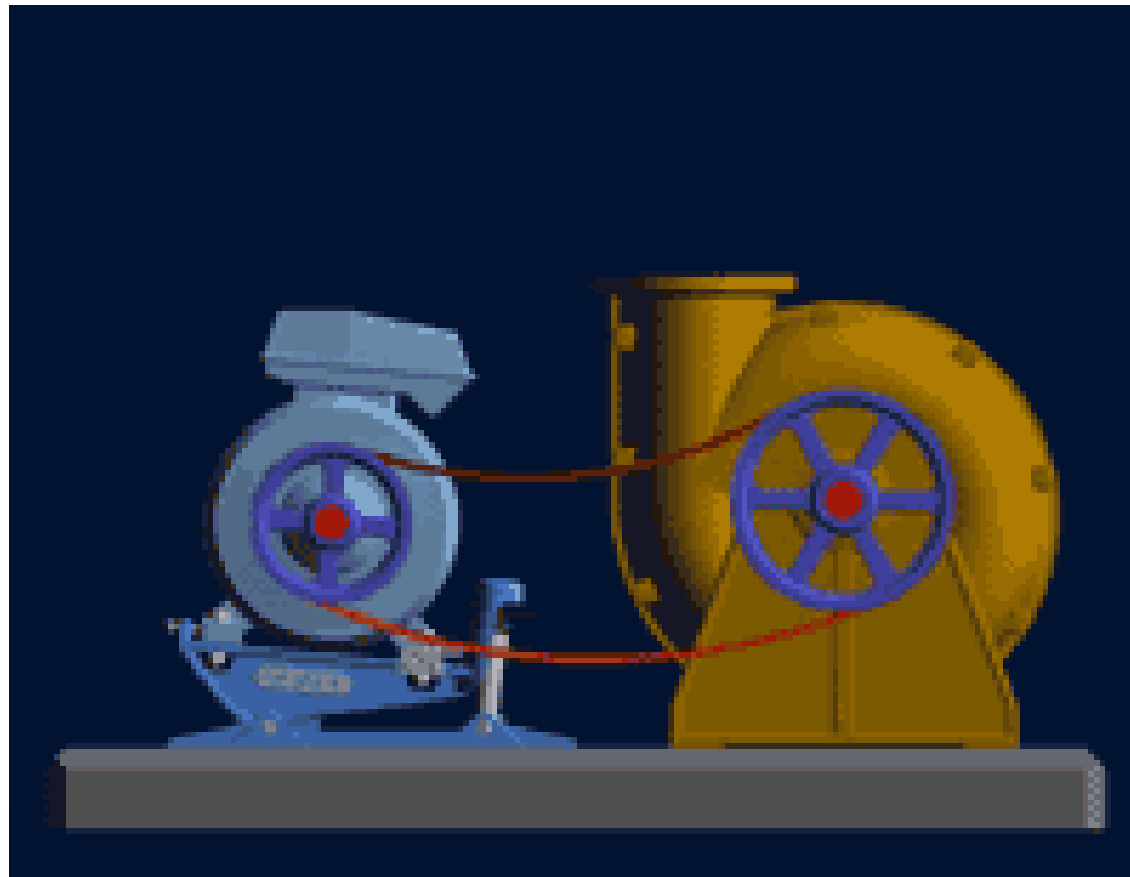


THE GEMEX METHOD

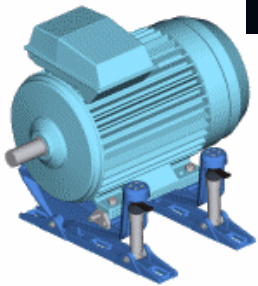
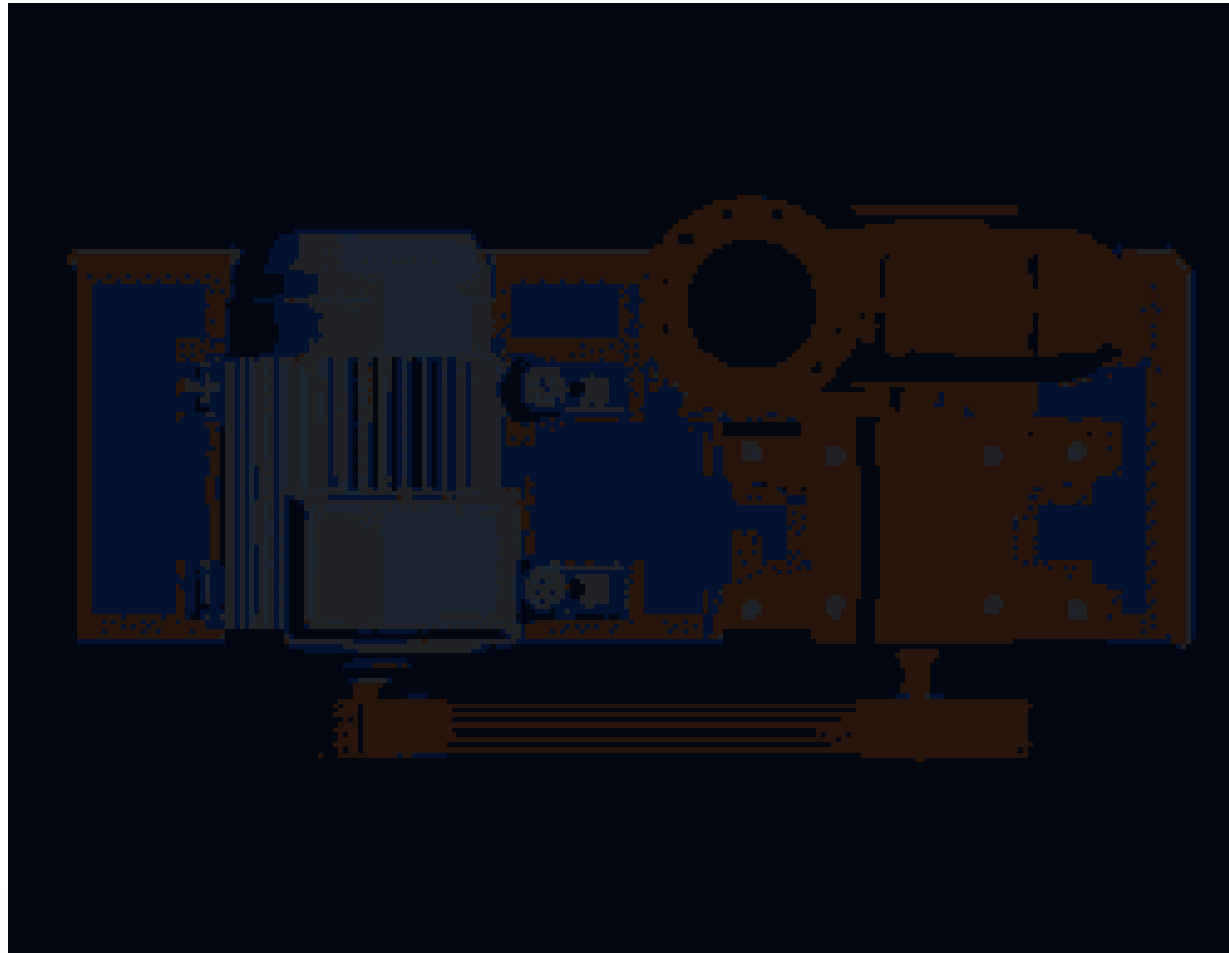
- the chair tilts, the belts are loosened
 - the hydraulic pump transforms the cylinders into a lift
 - the manometer determines the correct belt tension
 - the cylinders are mechanically locked
 - the motor is locked by the mechanical-hydraulic cylinders
-
- No further alignment is needed !
 - All moving parts are fully protected !
 - Gemex can be installed on all existing frames !

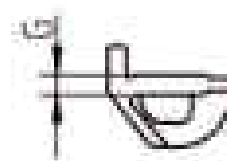
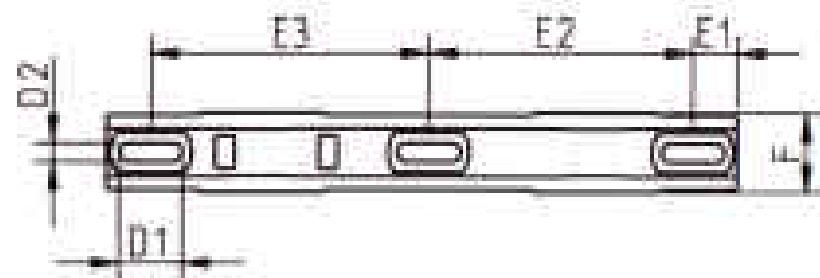
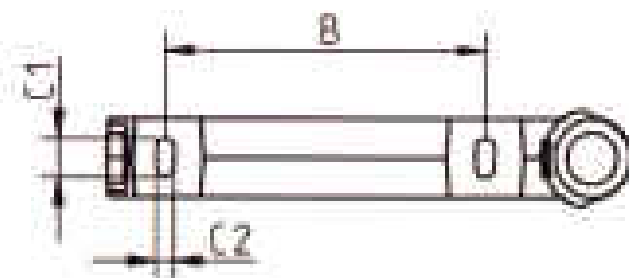
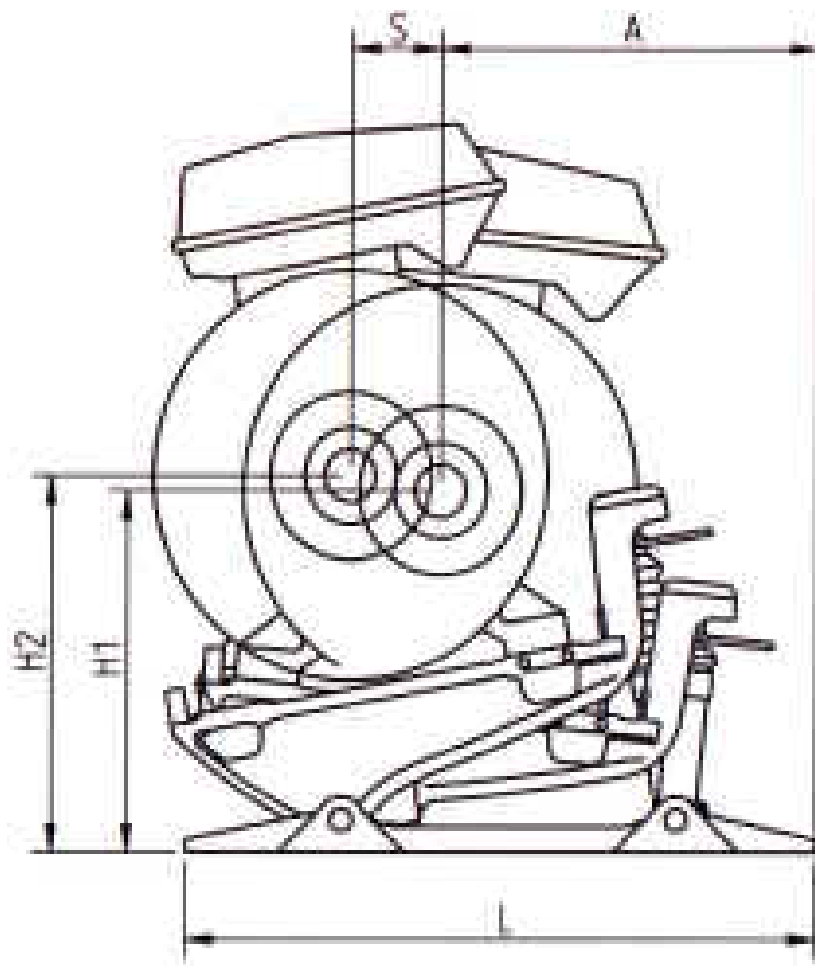


THE GEMEX METHOD



THE GEMEX METHOD

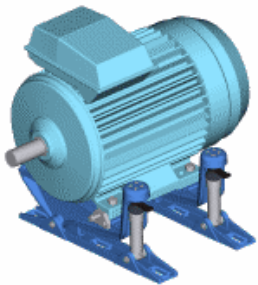




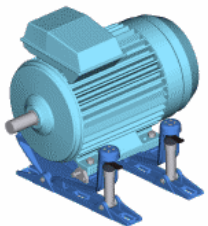
GEMEX TECHNOLOGY

GEMEX GUARANTEES

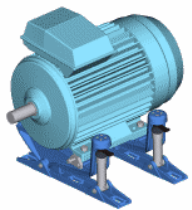
- A **fast and efficient alignment and replacement** of the belts
- An **increased productivity** of your technicians by 85%
- **Reduced stops** for belt replacement and general maintenance
- An **extended longevity** for belts, pulleys and bearings
- An excellent **integration and installation** on existing configurations
- Shorter and better **interventions**
- Possible **energy savings** up to 7%
- **Safety**



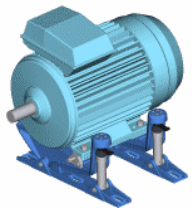
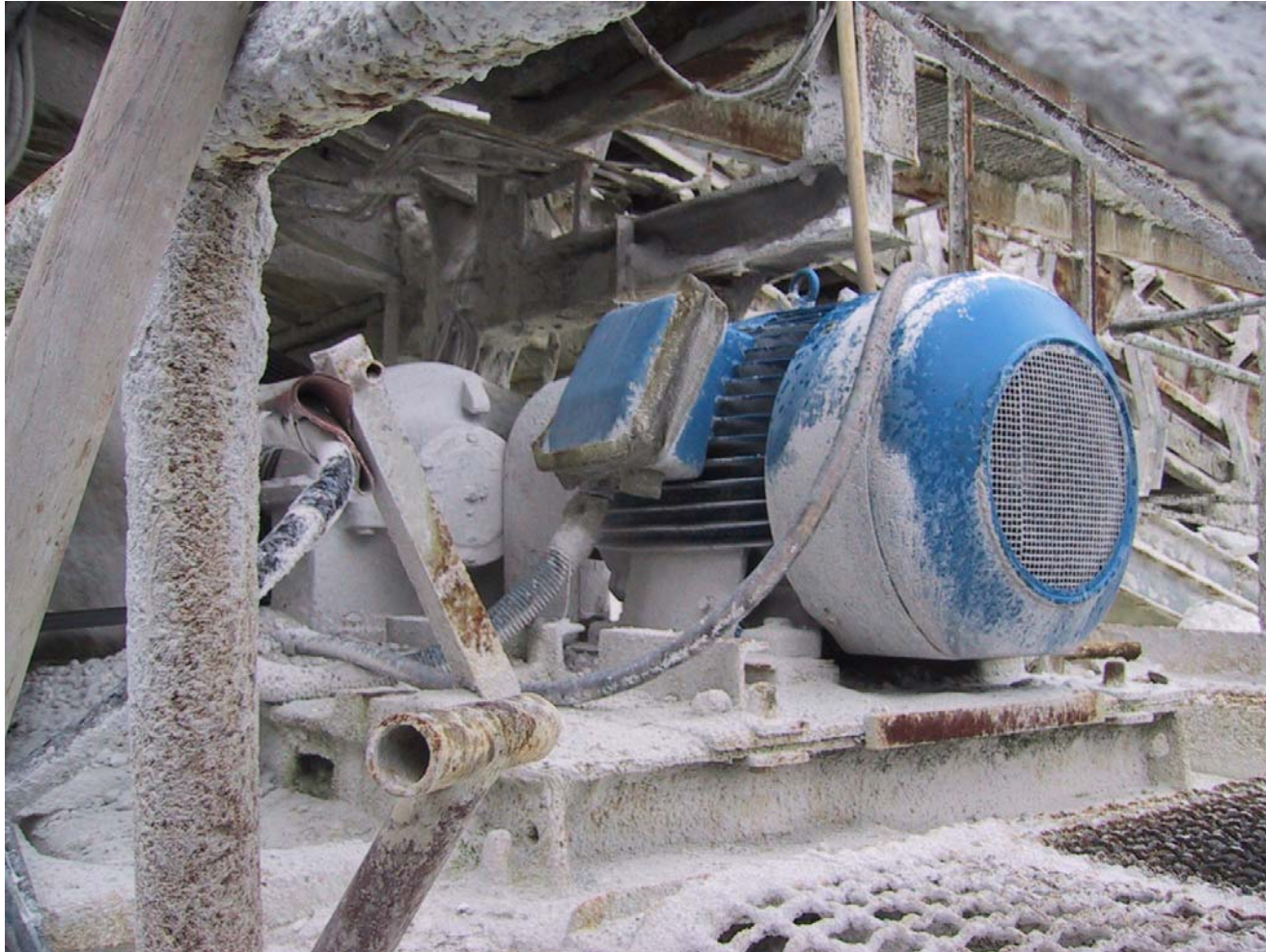
SOME EXAMPLES WITH AND WITHOUT GEMEX



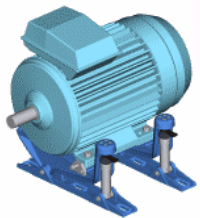
SOME EXAMPLES WITH AND WITHOUT GEMEX



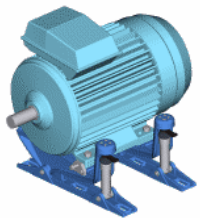
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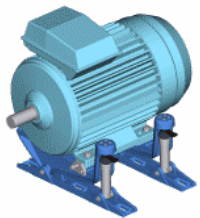
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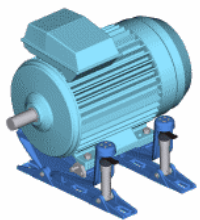
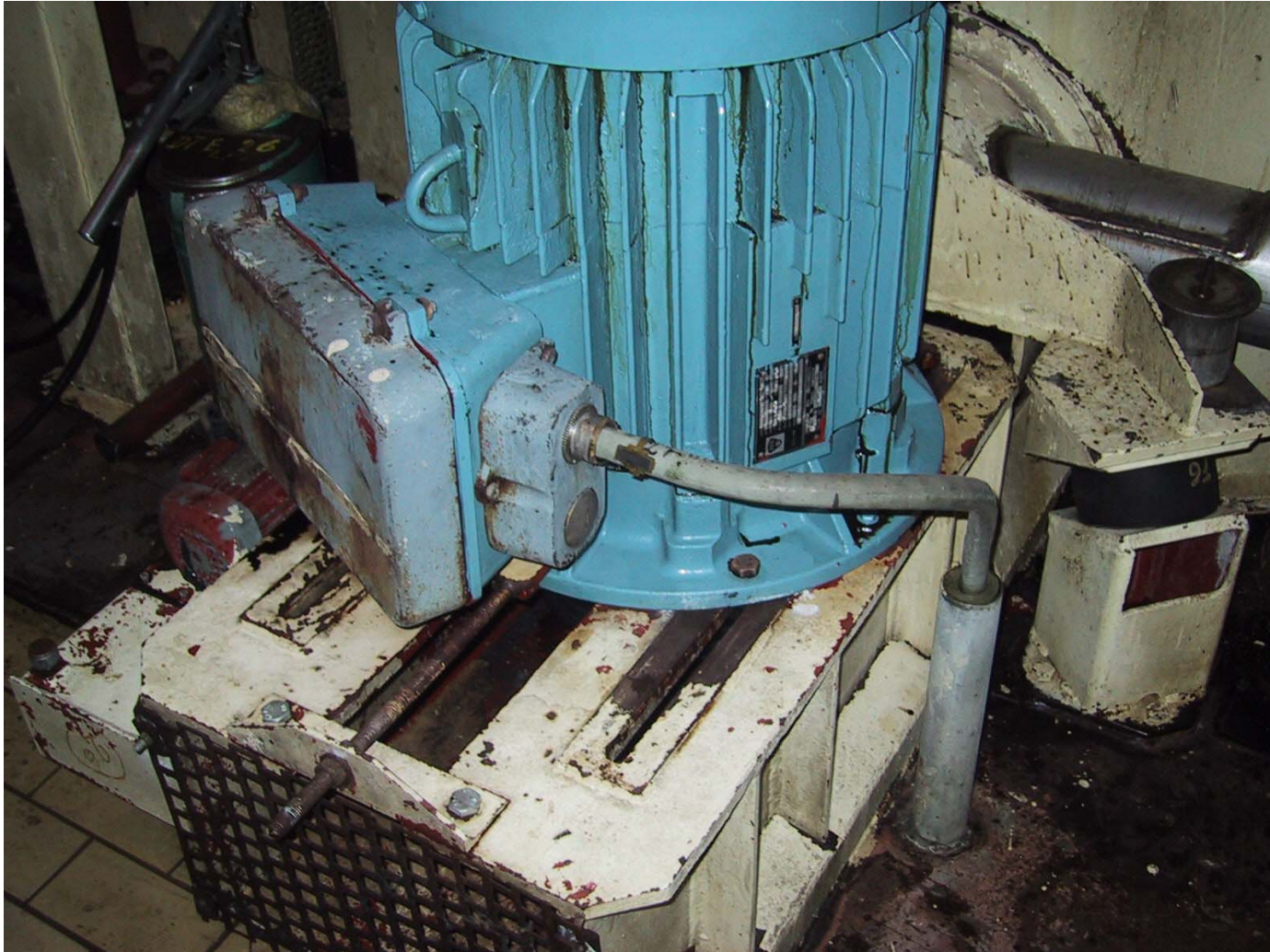
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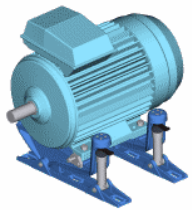
SOME EXAMPLES WITH AND WITHOUT GEMEX



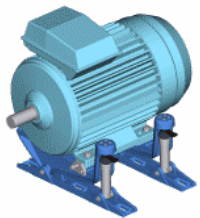
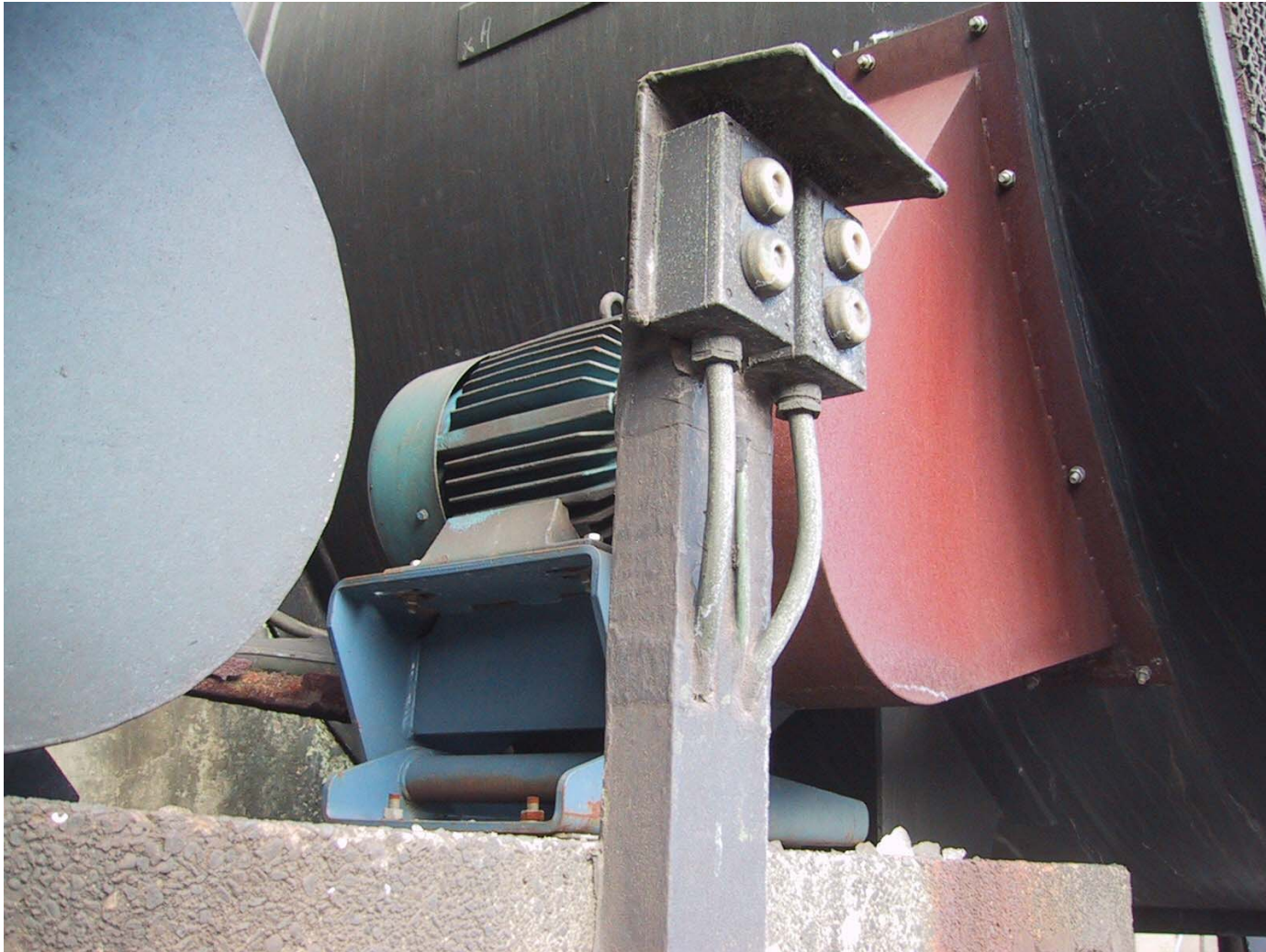
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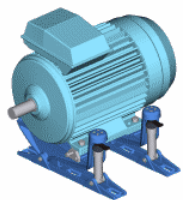
SOME EXAMPLES WITH AND WITHOUT GEMEX



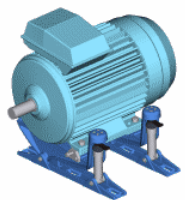
SOME EXAMPLES WITH AND WITHOUT GEMEX



SOME EXAMPLES WITH AND WITHOUT GEMEX

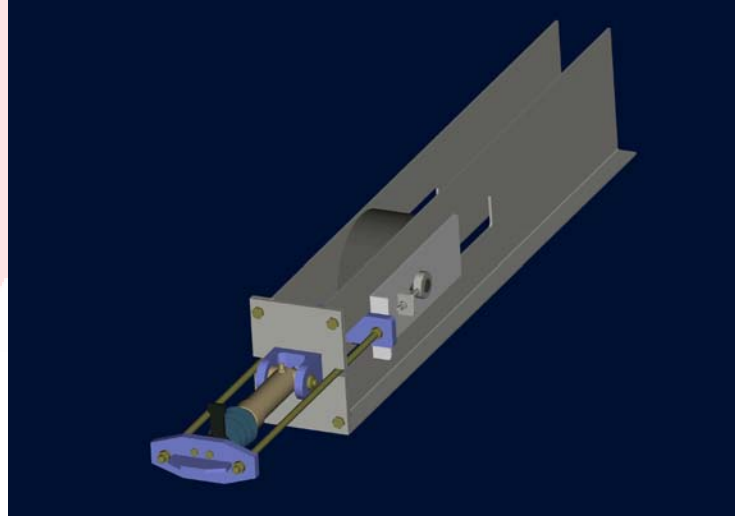
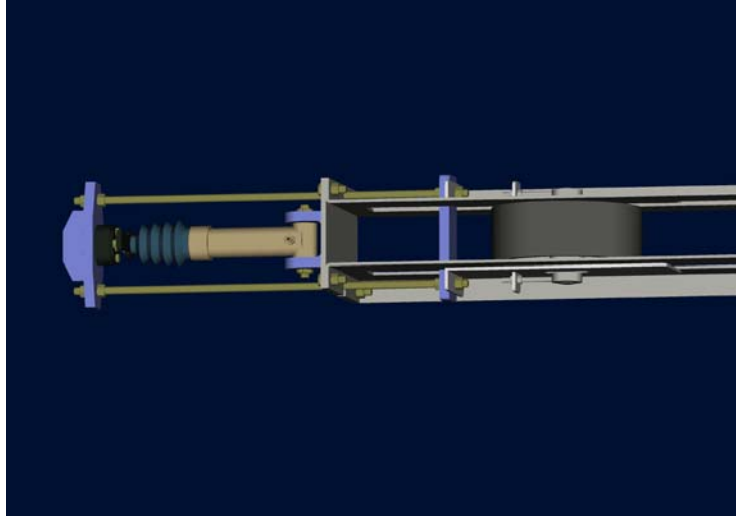
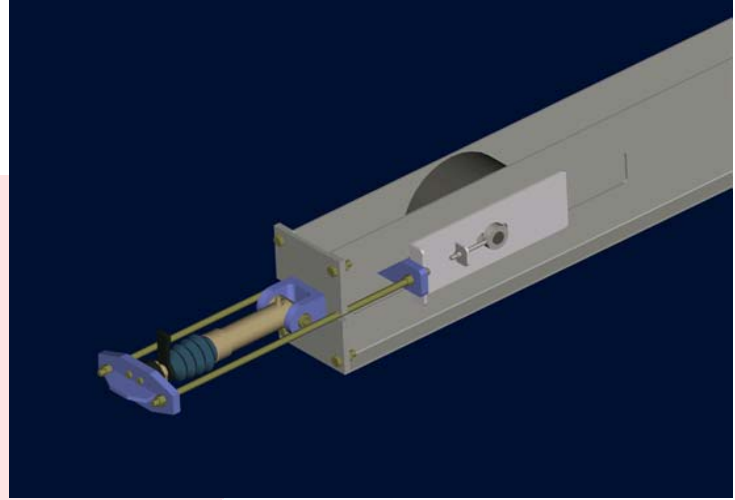
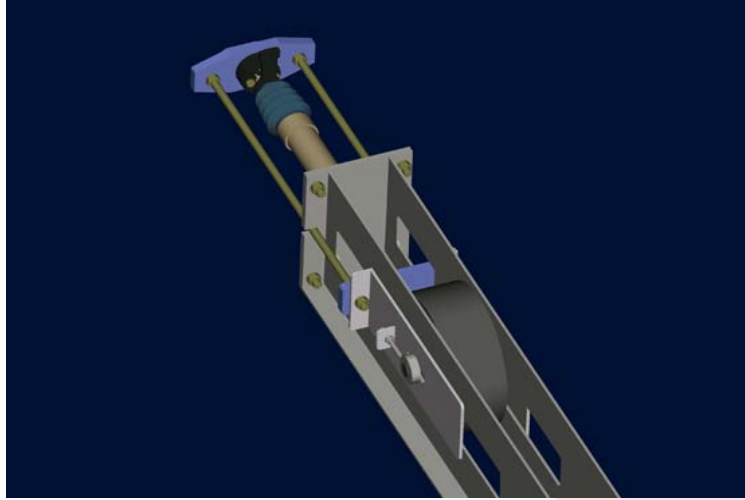


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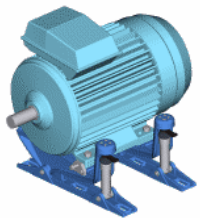


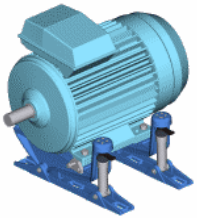
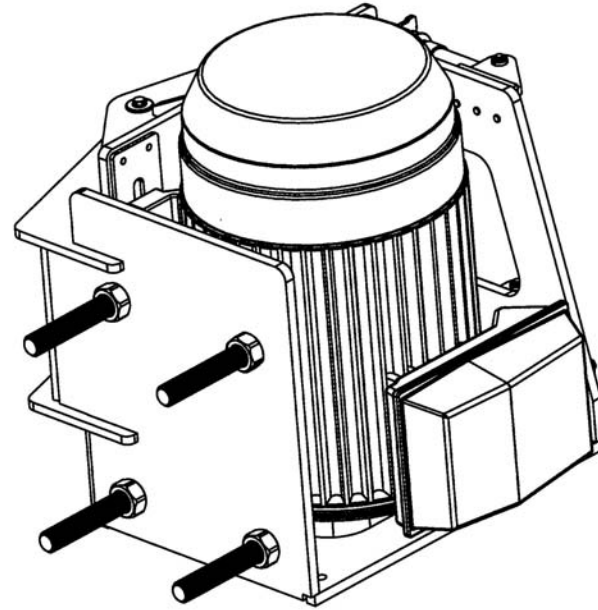
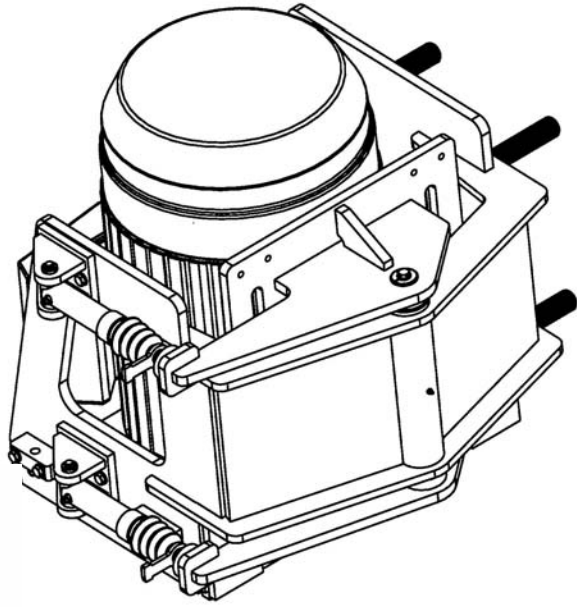
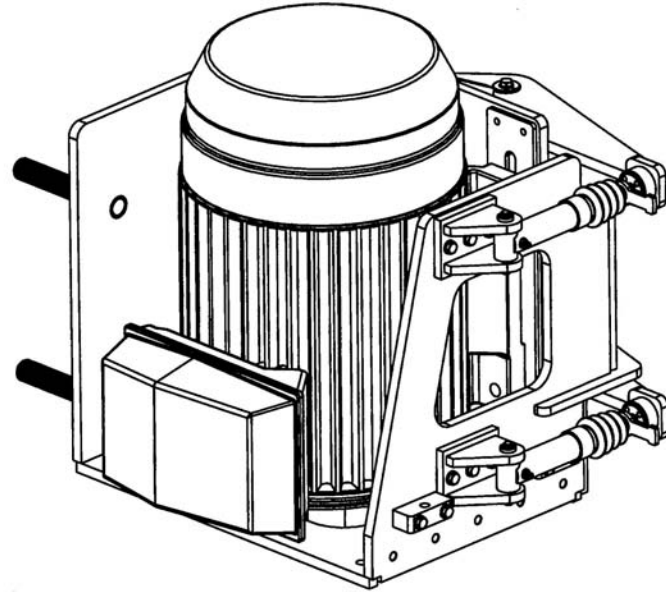
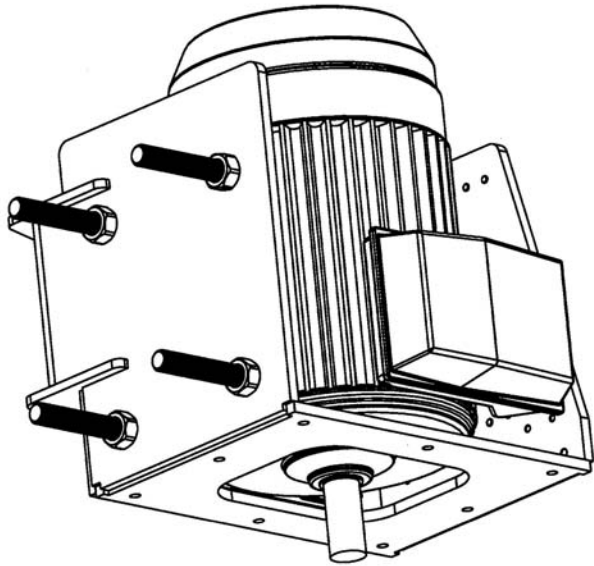
CONVEYOR BELT FOR THE CAR INDUSTRY



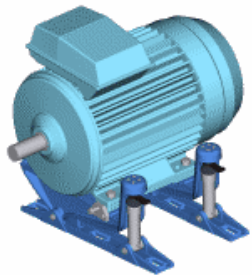


SOME EXAMPLES WITH AND WITHOUT GEMEX





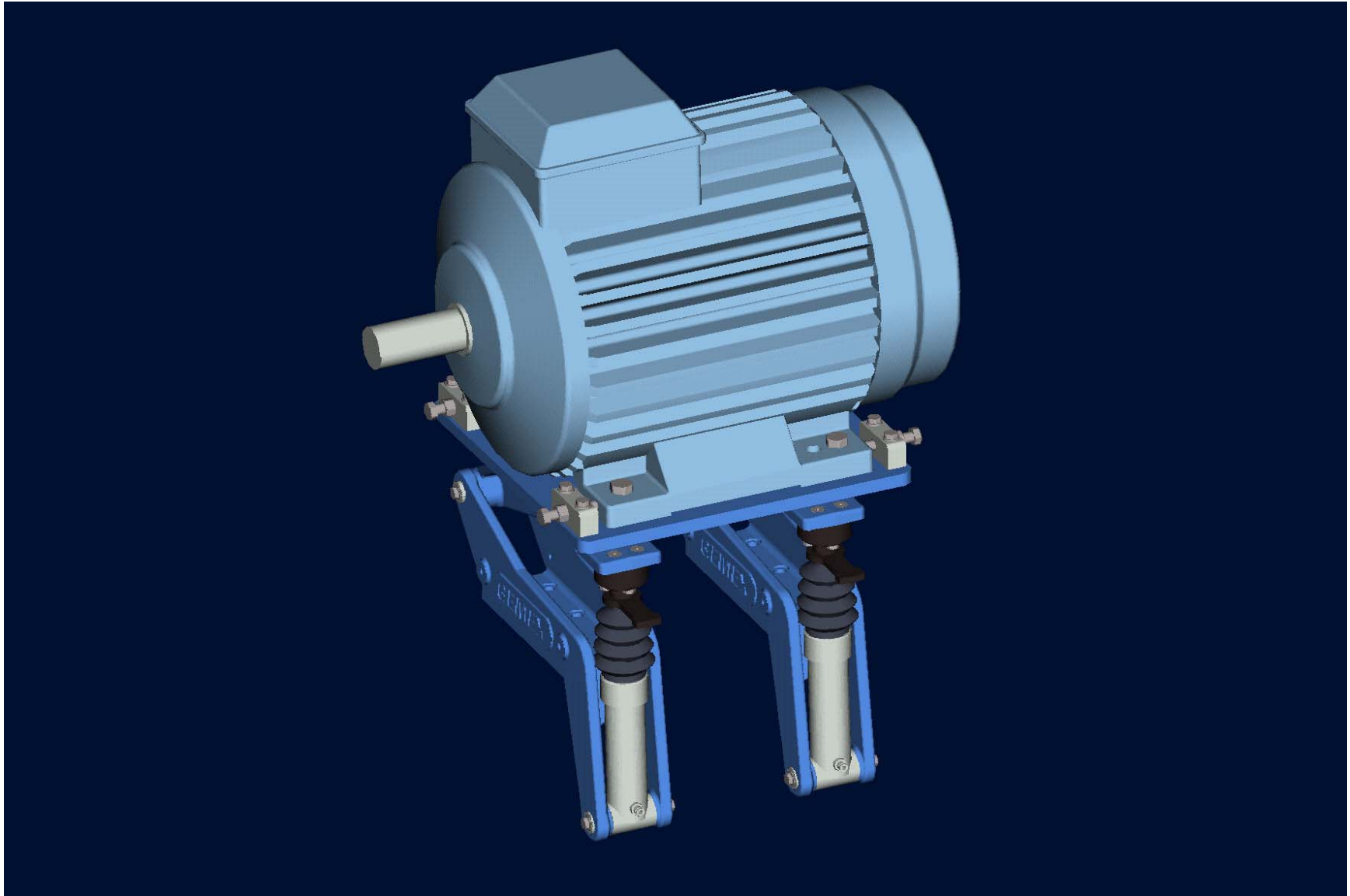
SPECIAL APPLICATIONS



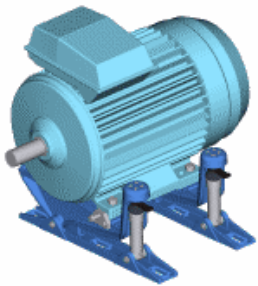
TOP MOUNTED



SPECIAL APPLICATIONS

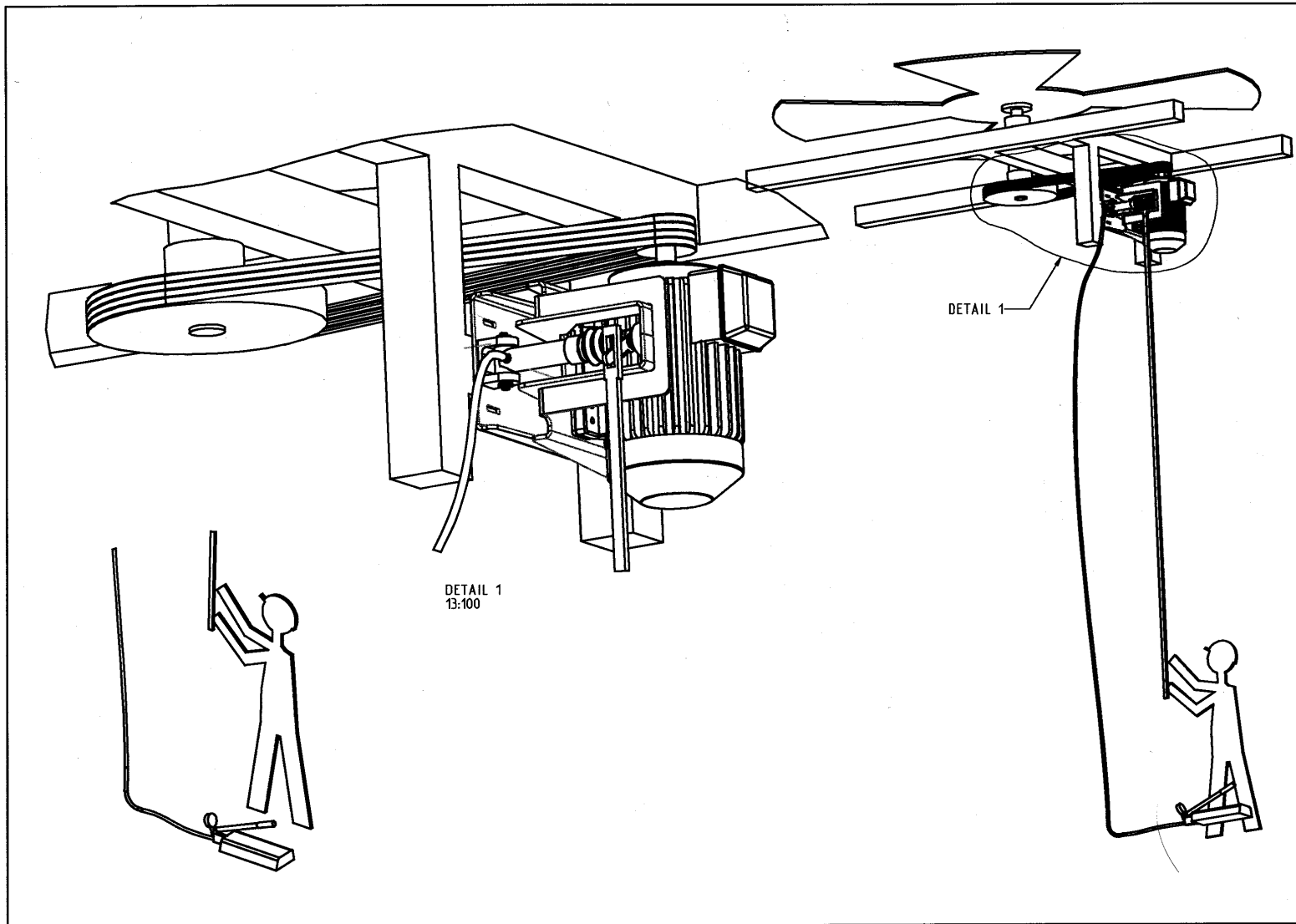


SPECIAL APPLICATIONS

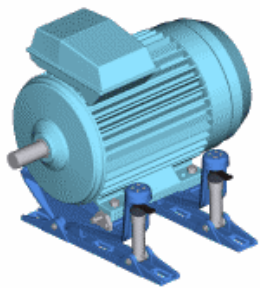


VERTICALLY MOUNTED

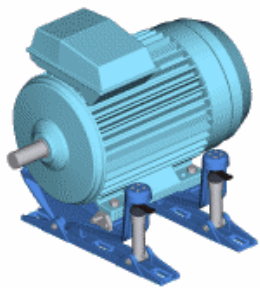
SPECIAL APPLICATIONS

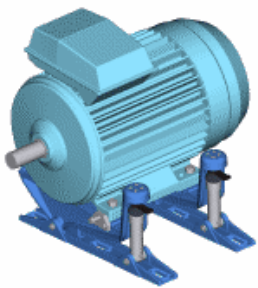


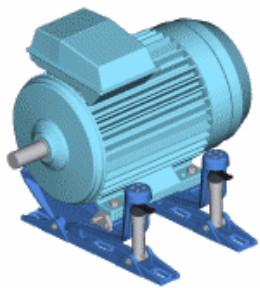
SPECIAL APPLICATIONS



SPECIAL APPLICATIONS

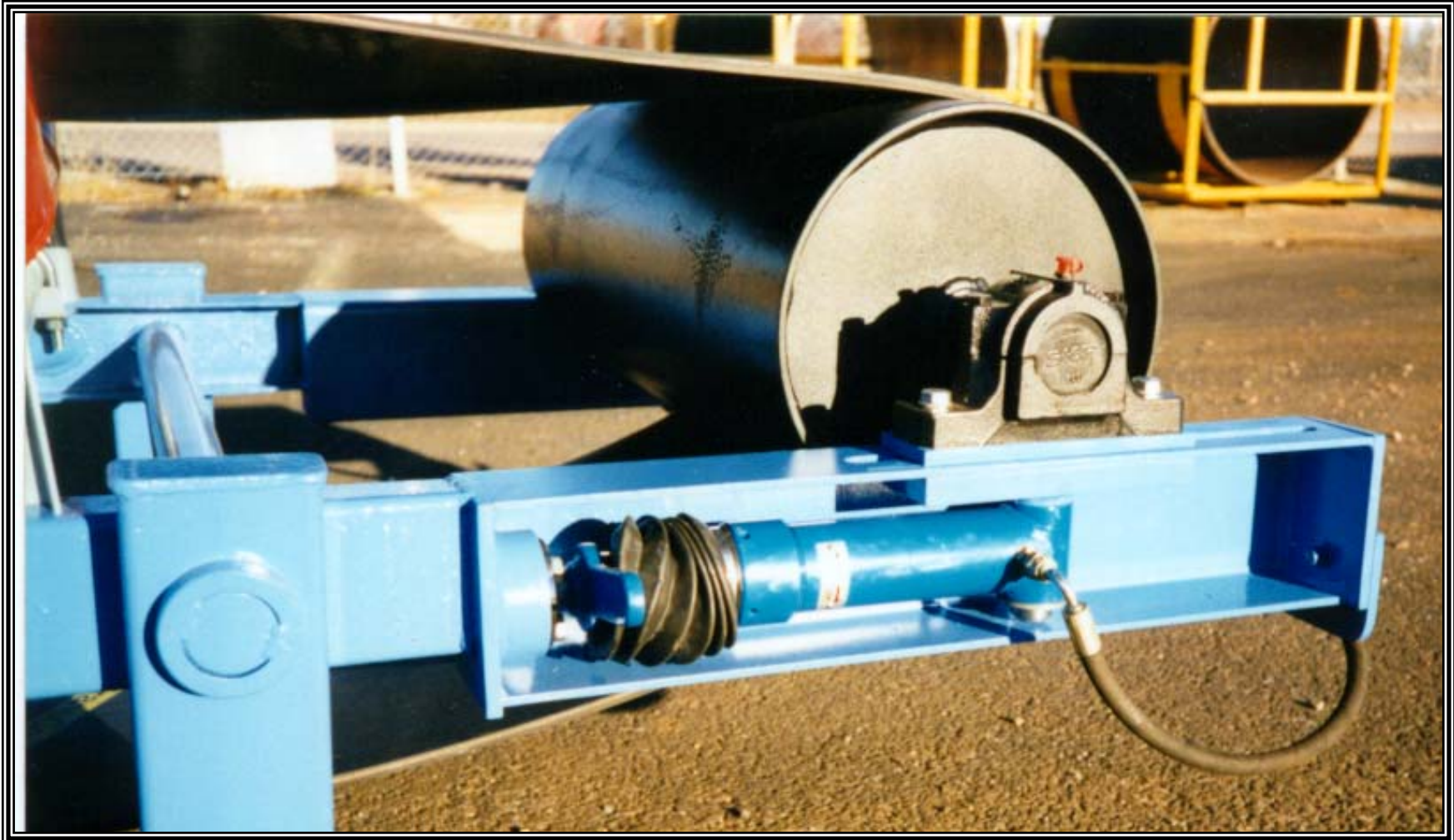




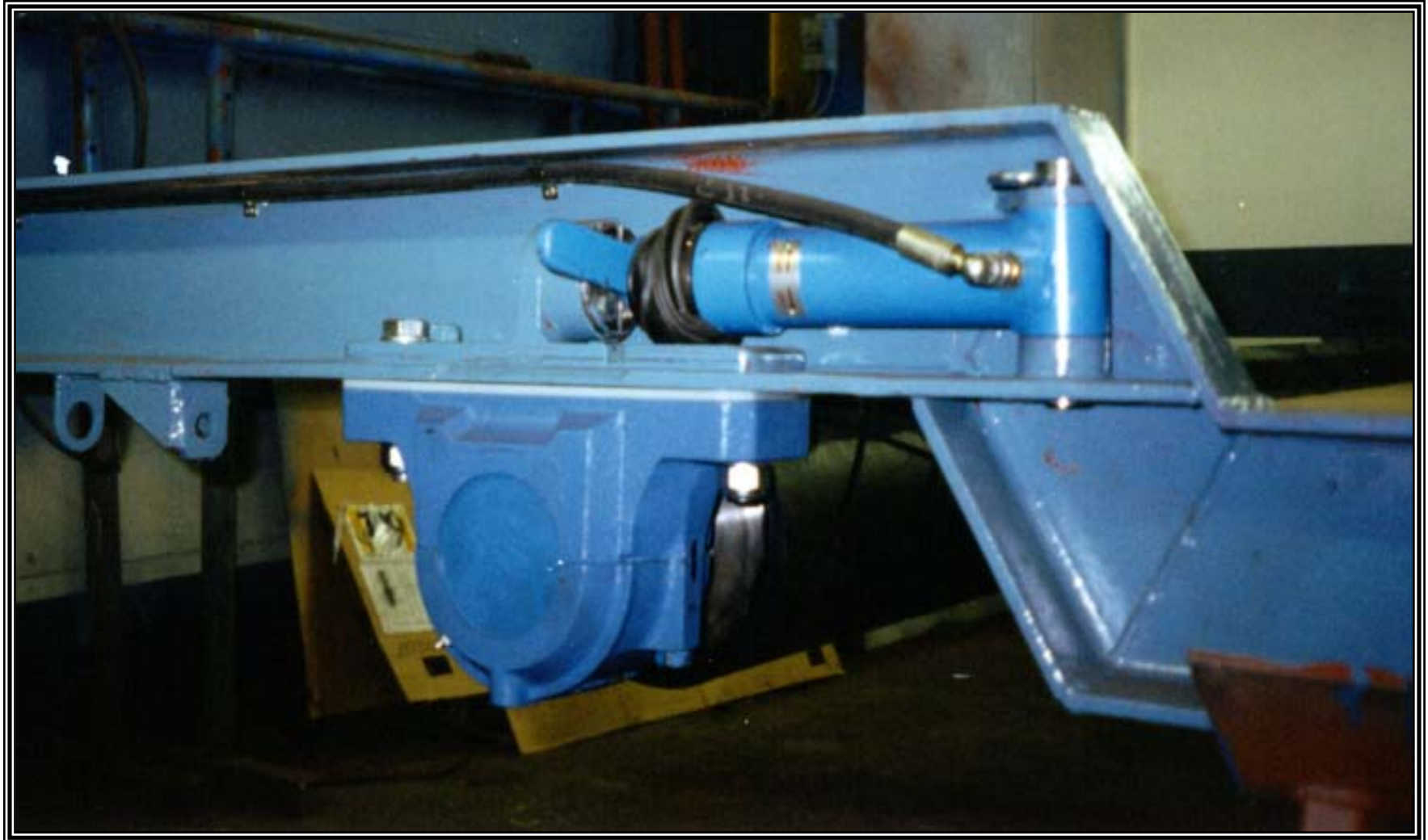




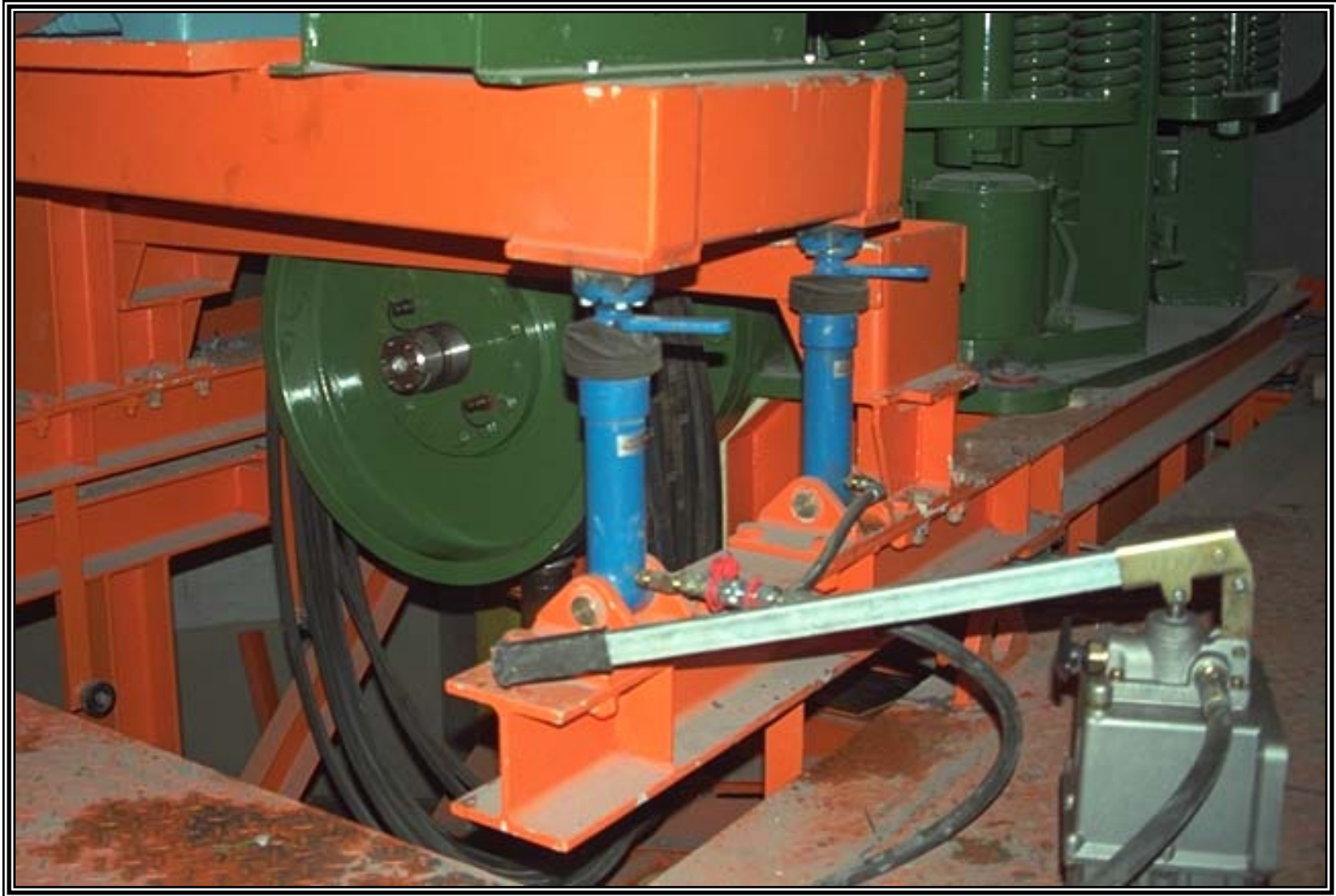
SPECIAL APPLICATIONS



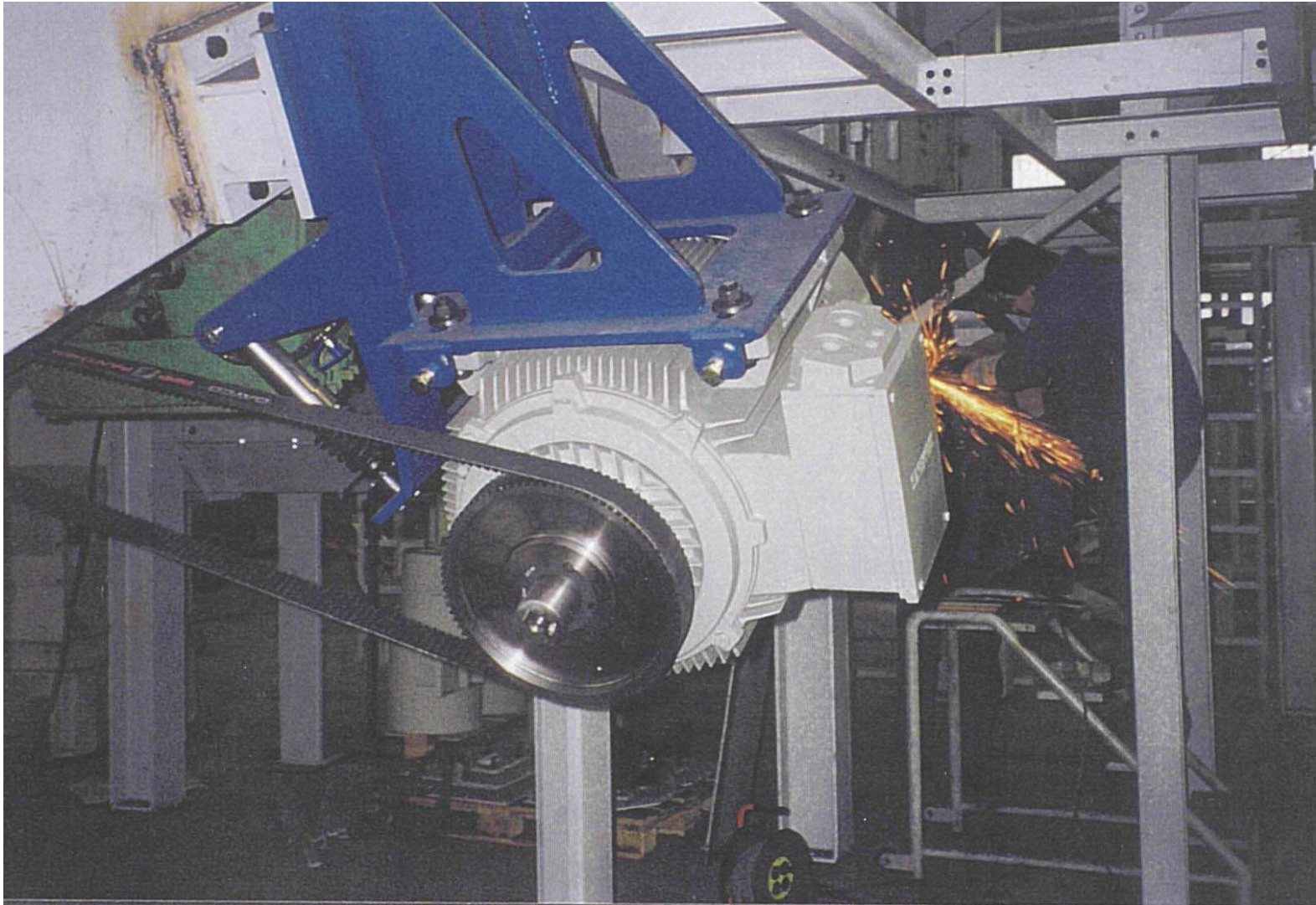
SPECIAL APPLICATIONS



SPECIAL APPLICATIONS



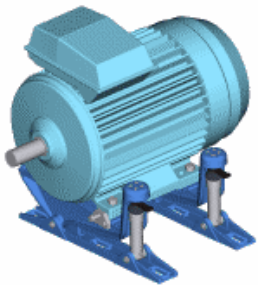
SPECIAL APPLICATIONS



ENERGY SAVINGS AND GEMEX

Basic ingredients for energy saving:

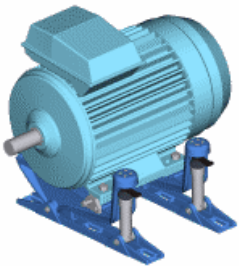
- perfect alignment
- correct tension
- accessibility

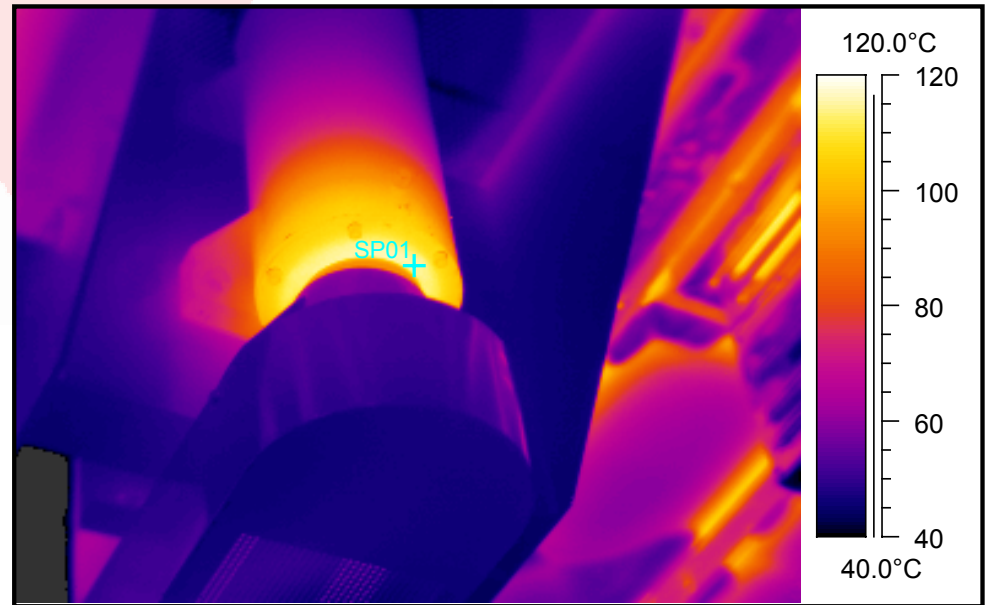
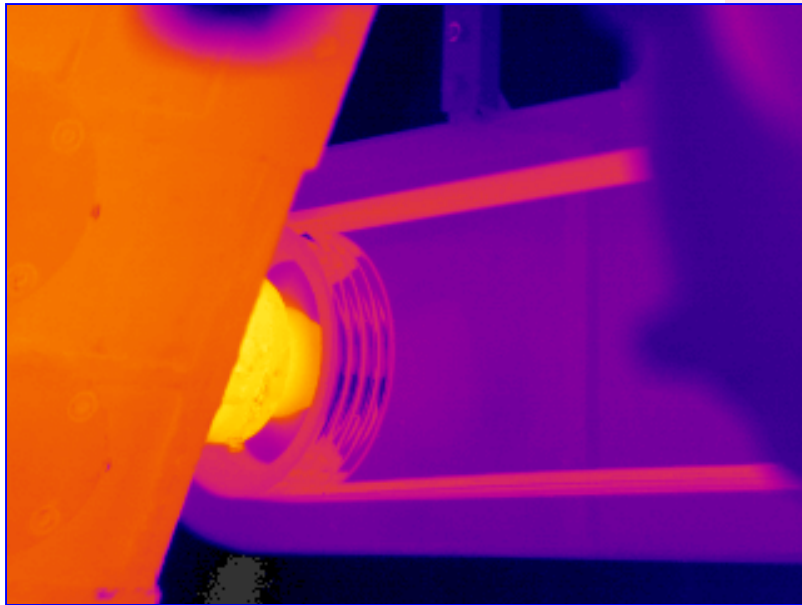
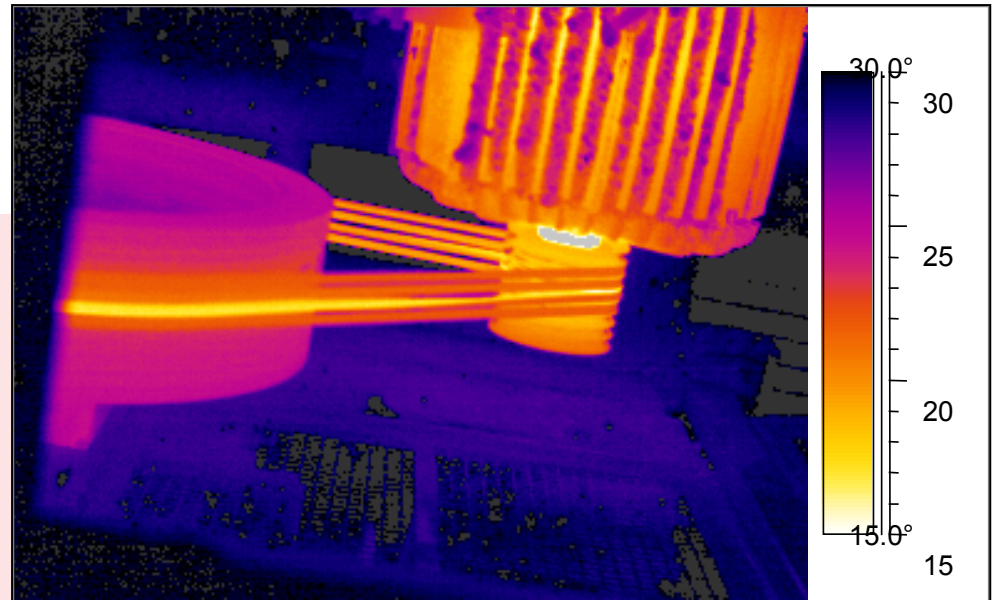


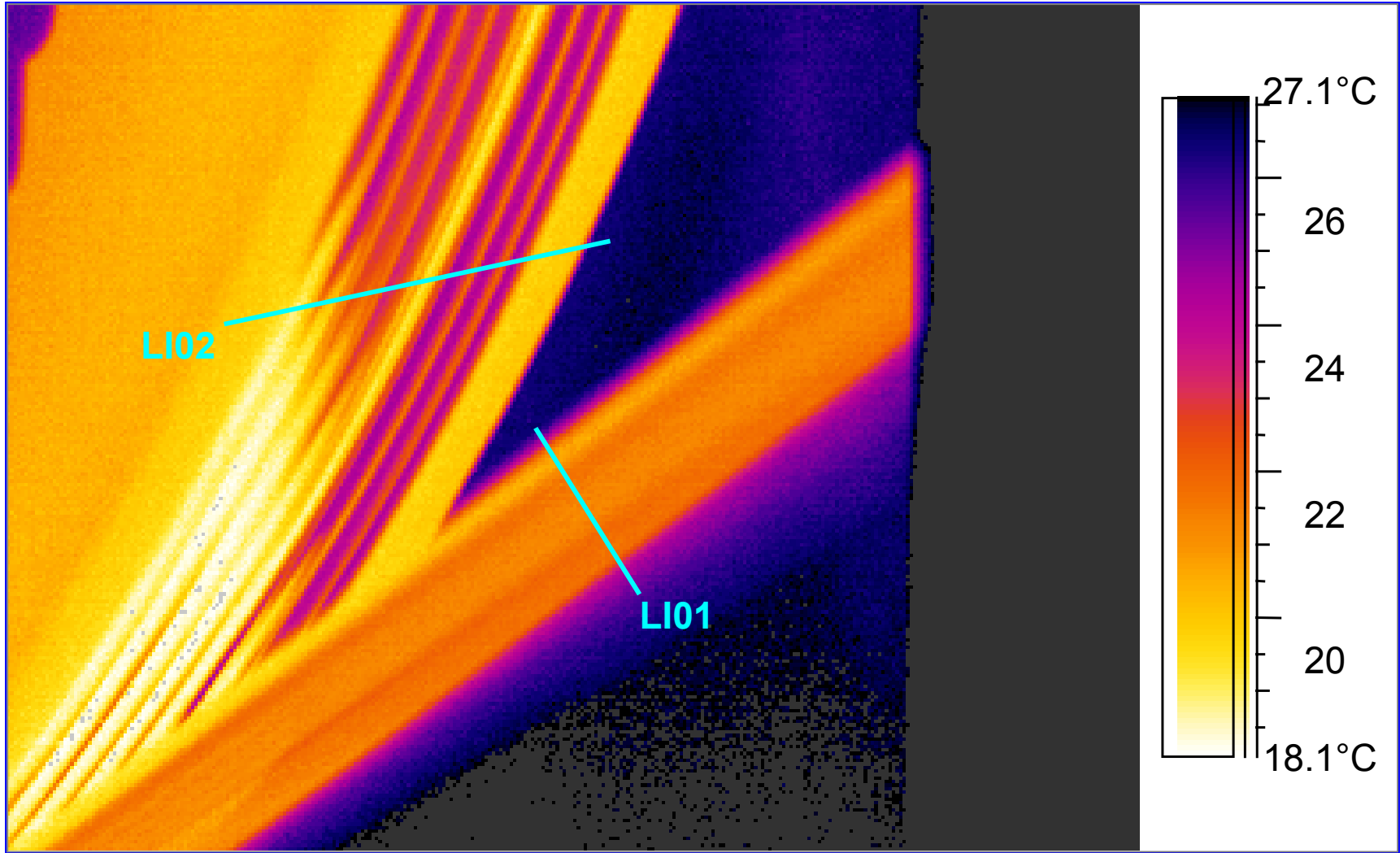
ENERGY SAVINGS AND GEMEX

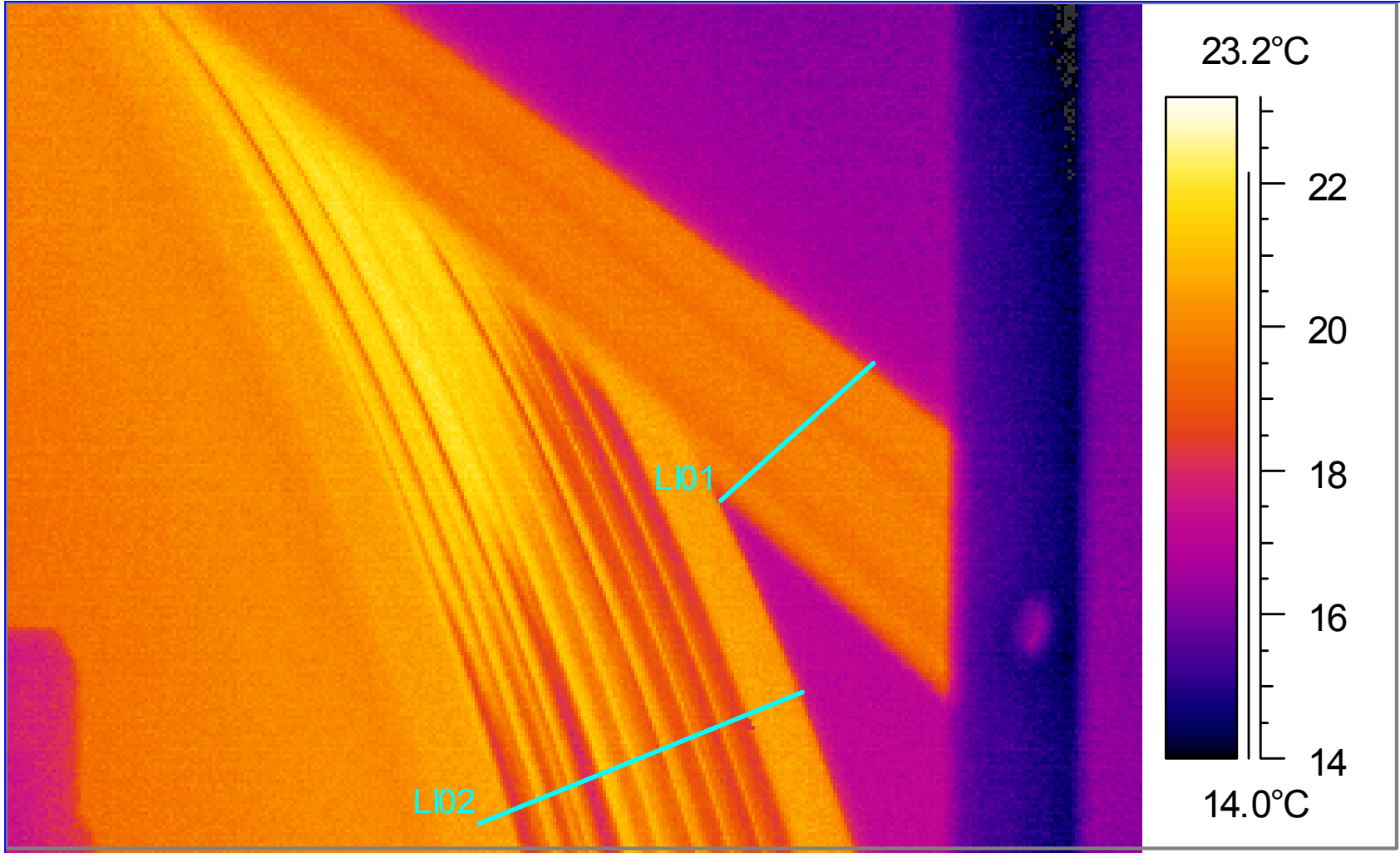
Causes of energy waste

- outdated tools
- engineering vs. demands of efficiency and economy
- outdated methods of construction
- alignment and tension action at the same time
- priority to production
- production stops are unavoidable in case of a slip



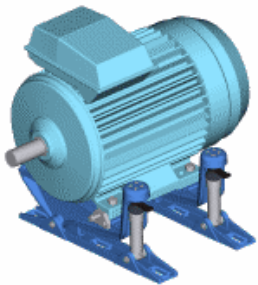






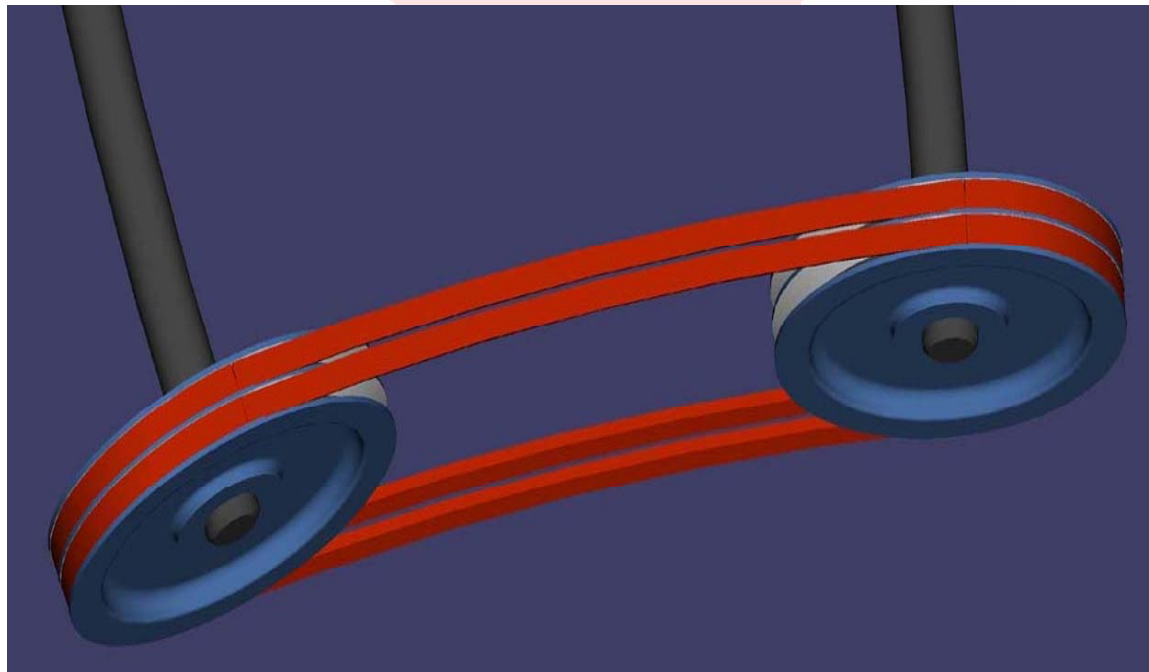
ENERGY SAVINGS AND GEMEX

- removal of belt covers
- corrosion
- accessibility
- lack of time
- production versus maintenance



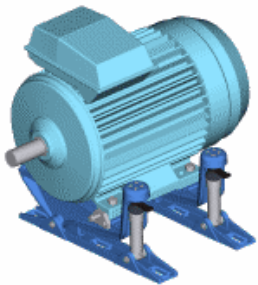
ENERGY SAVINGS AND GEMEX

- alignment at the time of installation
- alignment without belt tension
- no shaft bendings nor torsion



ENERGY SAVINGS AND GEMEX

- motor will always be perfectly aligned
- belt tensioning AFTER the alignment
- calculation of the belt tension and certification



Customer
gemex demo
rammeloo

Sender
Maintenance Partners
rammeloo



Drive Calculation
V Belts 2 Pulley Drive



No.: 000100
SN: 88117131

Page: 3
Date: 24.10.2002

Calculations

Based on a theoretical belt life of 25000 h

The drive requires:

- 4 pce(s) Optibelt-Super-TX wedge belt XPB 2800 Ld M=S
- Optibelt-KS pulley bored for taper bush TB SPB 200-4
- Optibelt-TB taper bush 3020 (Bore diameter 25-75 mm)
- Optibelt-KS pulley bored for taper bush TB SPB 315-4
- Optibelt-TB taper bush 3535 (Bore diameter 35-90 mm)

Deviation/Hints

Type of driver unit	:	*****	
Type of driven unit	:	*****	
Calculation Power	PB:	42.00 kW	
Driver Power	P:	30.00 kW	
Torque at driver pulley	M:	194 Nm	
Driver speed	n1:	1475 1/min	
Required driven speed	n2:	937 1/min	937 1/min
Datum diameter pulley 1	dd1:	200.00 mm	
Datum diameter pulley 2	dd2:	315.00 mm	
Datum length	Ld:	2800 mm	
Actual centres	C:	993.90 mm	***** mm
Actual drive ratio	i:	1.58	0.0 %
Adjustment required for belt fitting	y:	20.00 mm	
Adj. req. for belt tensioning	x:	35.00 mm	
Actual service factor	c2:	2.29	
Belt speed	v:	15.45 m/s	
Flex rate	fB:	11.03 1/s	
Power per belt	PN:	17.92 kW	
Arc of contact factor	c1:	1.00	
Belt length factor	c3:	0.96	
Arc of contact on small pulley	β:	173.40 °	
Pulley face width	b:	82.0 mm	
span length	l:	992.20 mm	
calculated number of belts	z1:	2.44	actual c2 = 1.85
Weight	:	35.58 kg	
Static shaft load, initial installation	Sast:	5232 N	
Static shaft load (retensioning)	Samin:	4025 N	
Dynamic shaft load	Sadyn:	3760 N	

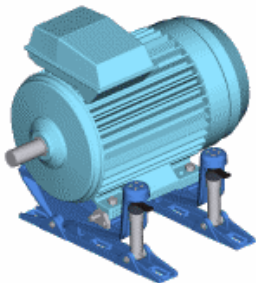
Tensioning recommendations

- actual c2 = 1.85
- OPTIKRIK II
 - Load/deflection tension gauge
 - Length addition value per 1000 mm belt length
 - Optibelt-TT Tension Tester

Initial installation Re-tension

	new belts	existing belts
Static tension per belt :	655 N	504 N
Load at centre of span:	75 N	75 N
Deflection:	23 mm	28 mm
Frequency:	30.2 1/s	26.4 1/s

Our "General conditions of Sale" are applicable



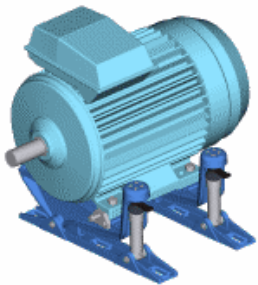
VSM-1 Tension Gauge
for Drive Belts



Belt tension checked with frequency system

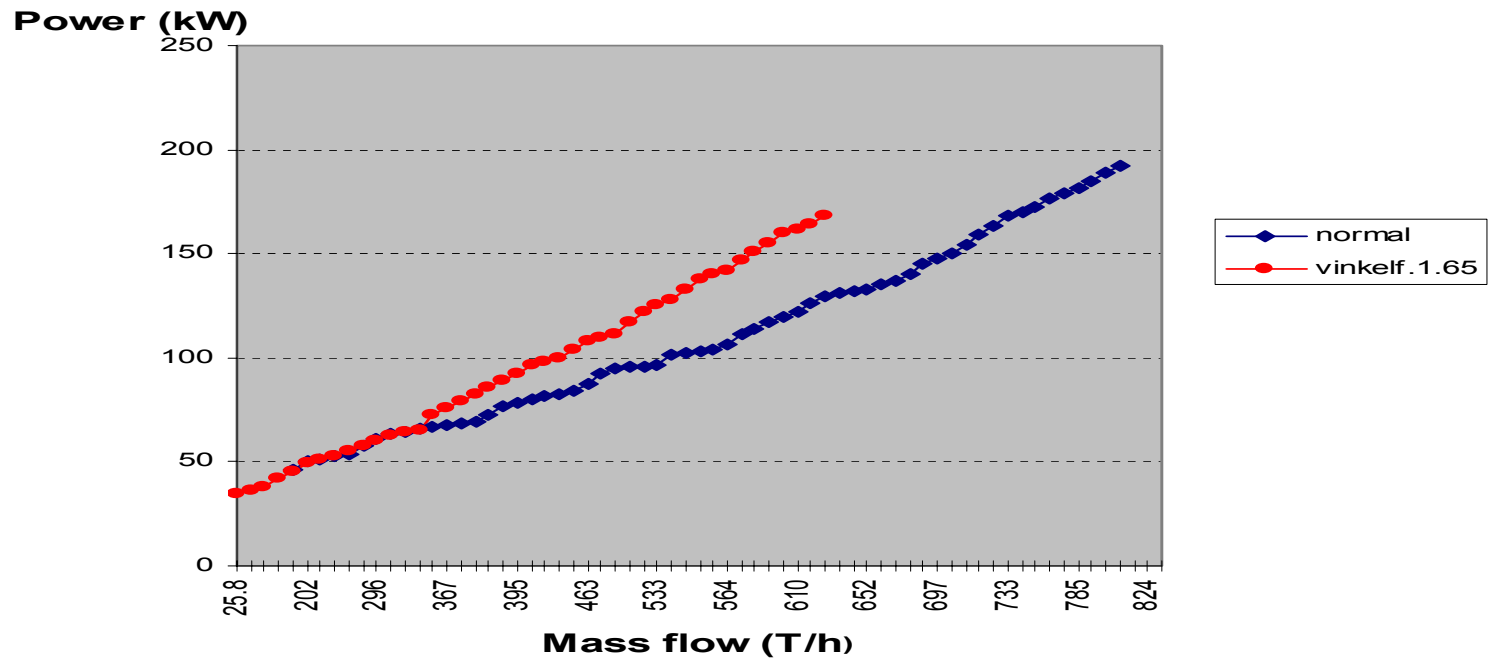
ENERGY SAVINGS WITH GEMEX

- hydraulic pressure is measured through the Gemex manometer
- belt tensioning during the productions
- in case of a slip, belts may be tensioned while producing
- extensive accessibility
- scientific evidence shows a possible energy saving of 3% to 7%
(study LKAB on 400 Gemex systems)

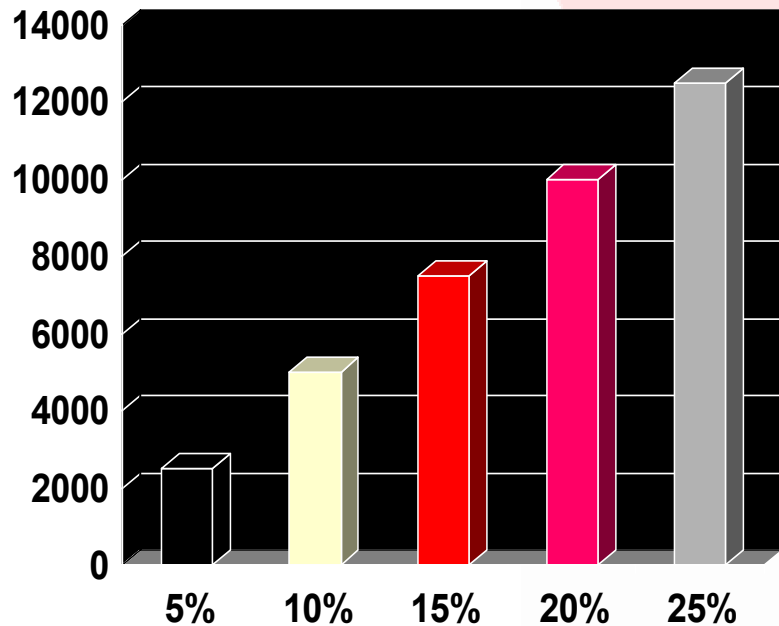


ENERGY SAVINGS AND GEMEX

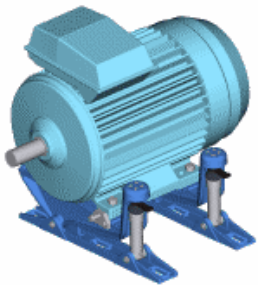
**KA2 Belt tension and angular fault
26PG006**



ENERGY SAVINGS AND GEMEX

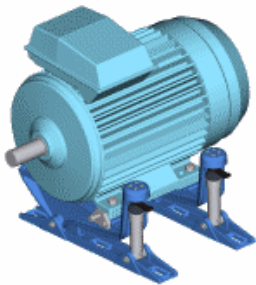


- ▼ **Electro machine: 132 kW**
- ▼ **Annual usage: 8 700 hours**
- ▼ **Energy cost: 0,05 € /kwh**
- ▼ Evidence shows that only 70% of the V-belts are efficiently used.
- ▼ Furthermore, the overall efficiency for V-belt applications may be increased up to 97%
- ▼ Efficient belt usage
- ▼ Decreased maintenance interventions



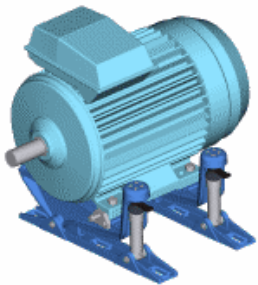
INCREASE PRODUCTIVITY OUTPUT

- increase a better output during productivity
- when belts are slipping, the tension can be adjusted while production is going on
- predictive maintenance



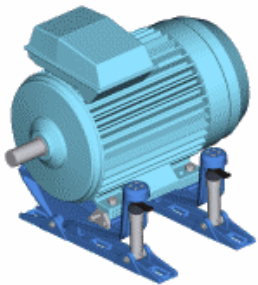
INCREASE PRODUCTIVITY

- shorten interventions
- accessibility
- everyone can do the job
 - no special education is needed
- only one technician is needed to replace the belts



SAFETY

- no risk for injuries
- no special education, every technician can do the job
- can be installed on every existing frame
- at the time of maintenance the belts are loosen



INTERNATIONAL AWARDS



1996: 'Invention of the Year' in North-Sweden



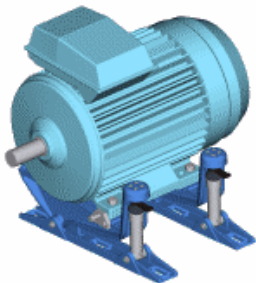
1997: Golden medal at the Eureka '97 World Exhibition of Innovation, Research & New Technology in Brussels



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Extensive information files in the book 'Energy Efficiency Improvements in Electric Motors & Drives'



Paolo Bertoldi
Anibal de Almeida
Hugh Falkner
Editors

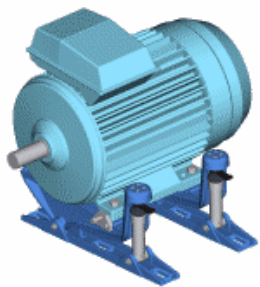
Energy Efficiency Improvements in Electric Motors and Drives

IPT INDUSTRIAL PRODUCTIVITY TOOLS
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Spechtenlaan 13
B-2950 Kapellen

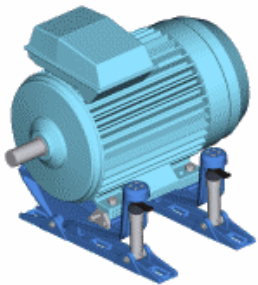
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 Springer



GEMEX IN A NUTSHELL

- Increased accessibility and availability
- Simple and efficient
- Shorter interventions
- Integration into existing configurations
- Energy savings
- Decreased costs of maintenance and manpower
- Safety



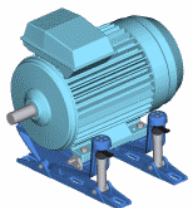
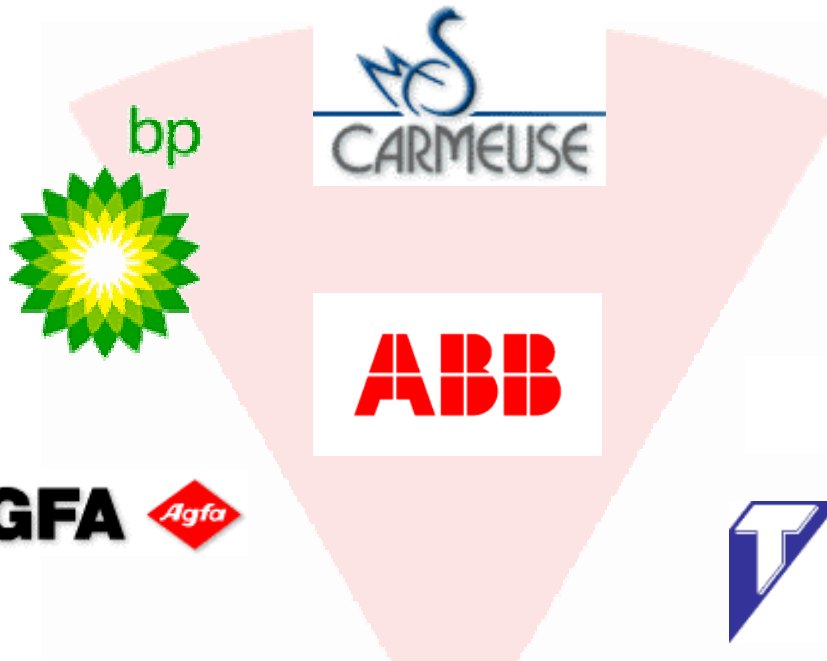


REFERENCES:



Cloos
Luxemburg

BASF



Norske Skog North America



REFERENCES:



DSM specialty compounds



Burgo ardennes

TotalFinaElf



Kappa



Université catholique de Louvain

Consulting Document

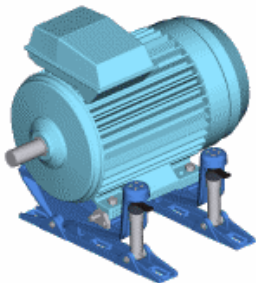
Kris Deckers / 24september88

Volkswagen Brussel N.V.

Overzicht van onbalanstrillingen gemeten op motor en ventilator, voor en na installatie van de Gemex motorstoel.

		MNV	MNH	MKA	MKV	MKH	VNA	VNV	VNH
Voor	35 Hz	0.7	1.0	0.6	1.0	0.3	0.2	1.2	2.1
	40 Hz	0.3	1.2	0.6	1.1	0.3	0.1	1.7	1.4
	45 Hz	1.7	1.2	0.5	1.2	0.2	0.2	1.1	1.0
	49 Hz	1.3	0.9	0.4	2.6	0.3	0.2	2.8	1.4
Na	35 Hz	0.4	0.7	0.6	1.0	0.6	0.1	0.4	1.0
	40 Hz	0.7	1.5	1.1	3.1	0.1	0.2	1.2	1.1
	45 Hz	0.5	1.0	0.2	0.5	0.4	0.1	1.3	0.8
	49 Hz	0.6	2.0	1.0	0.7	0.6	0.2	0.9	1.2

Volgende figuren geven telkens voor alle meetpunten de verschillende metingen. Deze metingen werden uitgevoerd voor 4 verschillende snelheden (35 Hz, 40 Hz, 45 Hz en 49 Hz). De eerste 4 spectra onderaan tonen de toestand voor modificatie (respectievelijke snelheden 35, 40, 45 en 49 Hz). De volgende 4 spectra tonen de toestand na modificatie (met Gemex motorstoel).





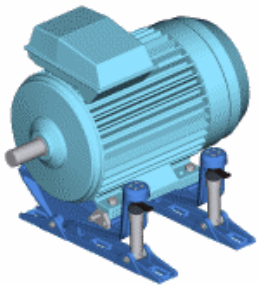
Ford Genk Assembly plant building C

COMPONENT BULLETIN

PAINT PLANT

GENK

Part II : MECHANICAL COMPONENTS



BELTS

Continental, Contitech, Optibelt, Synchroflex

BELT-TENSION-SYSTEM

Gemex (standard for drives > ~~55~~ kW)

30 kW.

BEARING

SKF

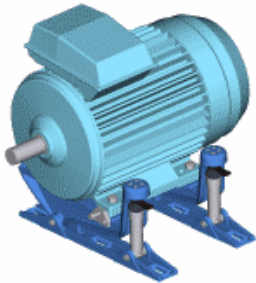
CHAINS

Wippermann

Floor-conveyor : CC5 (see general Ford-specification)

OHC-materiaal : CFC

STARTING-COUPLING



PUMPS

Centrifuge-pumps FF/EC (circulation-pumps): KSB, Egger

ASH's heating pumps : KSB

ASH's humidifying pumps : KSB, Grundfos

Drum-pumps : Graco

Dosing-pumps phosphate-EC : Sera

High pressure-pumps : SIHI, KSB

HOSES

Painthoses : Polypenco

Compressed air : Phoenix

Painthoses in Esta : Polypenco

HIGH PRESSURE MATERIAL

Thimm



Please visit our web site:

www.ipt-gemex.com

Or contact us:

John.rammeloo@maintenancepartners.com

