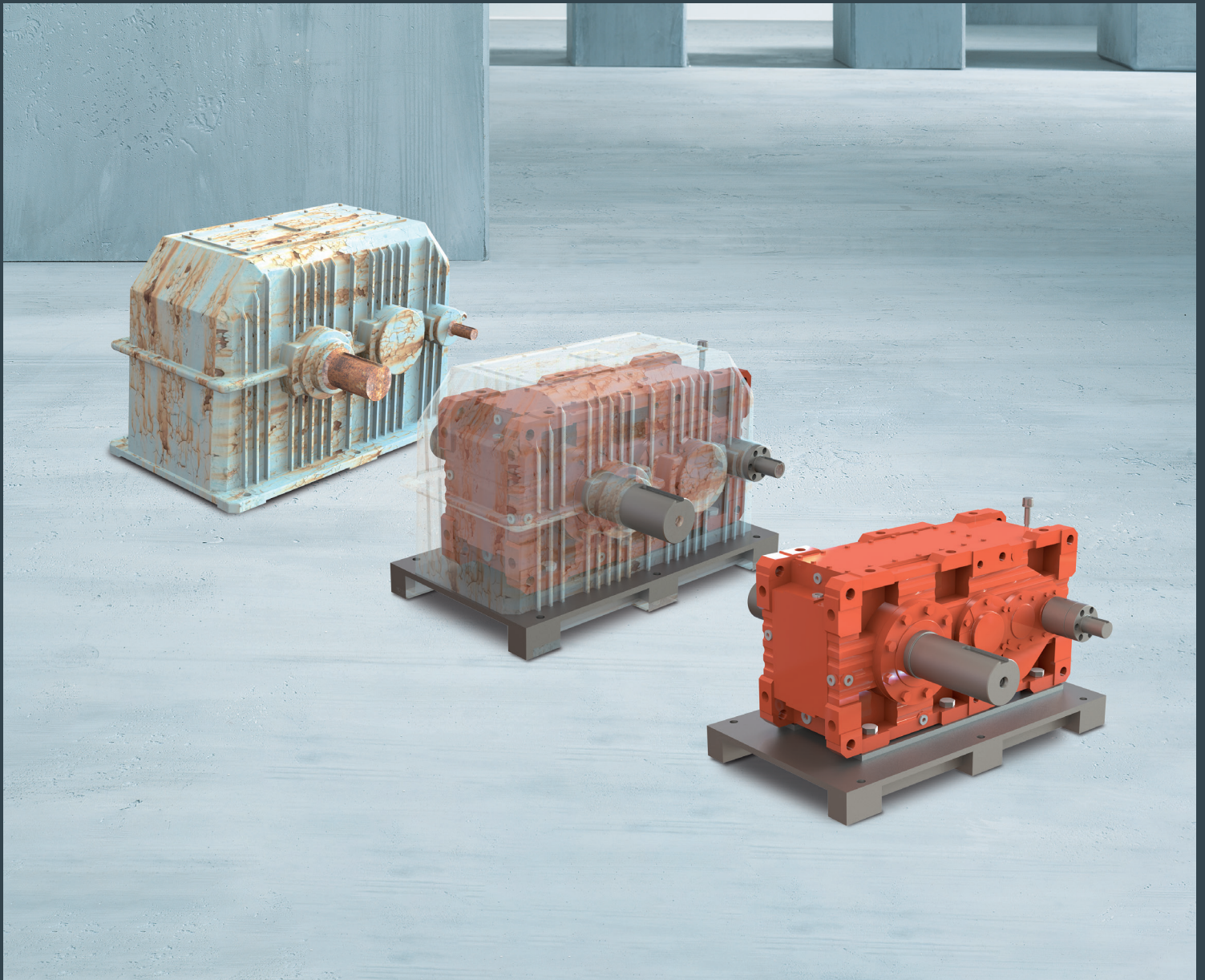


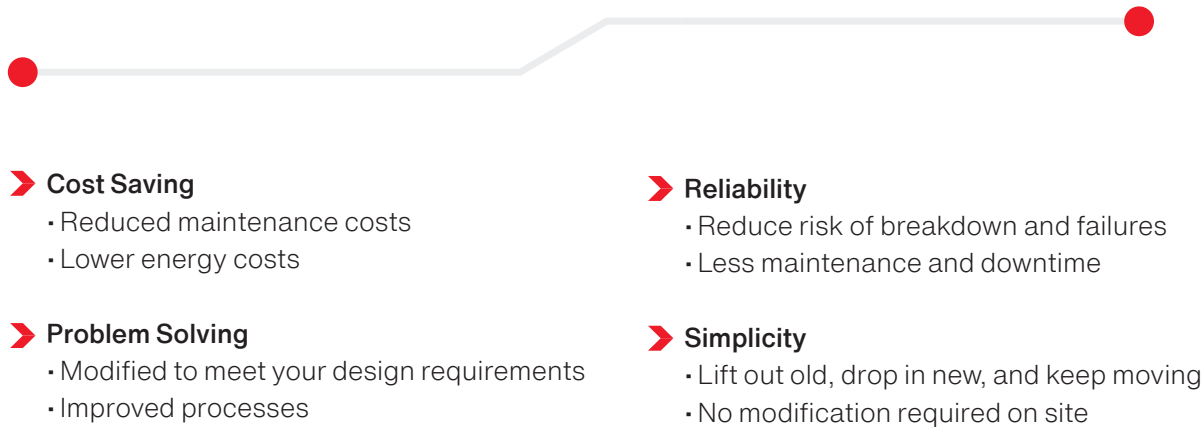
Drop-in drive replacements for large gear units

Custom replacement drives that fit the existing space



Drop-In Replacement Solutions: An Overview

A “drop in” is simply means replacing an old gear unit with a new, far more efficient unit. SEW-EURODRIVE engineers design custom replacements that fit perfectly into the existing spaces — often requiring no extra space.



Maximize your efficiency: Inefficient Worm Gear vs. Modern Replacements

To maximize efficiency savings, it's important to look at your overall drive system, as there can be significantly more efficiency gains other than your motor.

Worm Gear

Worm gear units have historically been a cost-effective solution; cheap to produce when manufactured in high volumes. The downside to this solution is the worm gear causes significant efficiency losses and heat due to friction. Modern replacements to the inefficient worm gear units include highly efficient helical and helical-bevel gear combinations.

Modern Solutions

SEW-EURODRIVE helical and helical-bevel gearboxes are manufactured using the latest gearing technology. Tooth profile, tooth pitch, and pressure angles together with precision fine ground profiles have been optimized to transmit the highest torque possible, while maintaining highest efficiency levels.



Little Known Fact:

The efficiency gain between an IE3 and IE2 efficiency motor ranges from 1% to 3% while the efficiency gain between a modern helical gearbox and worm gear can be as much as 45%.

Minimizing downtime and costs with innovative solutions



Delivered and ready to drop in

➤ Replacement vs. Repair

The cost of repairing a legacy gear usually exceeds the cost of replacing it with a modern helical gearbox. Not only do you have to consider the downtime associated with the unit being out of service for repair, but also the cost to remove it, and then replace it when the repaired drive is ready to go back to service.

When an aging drive is ready to be replaced, a modern drive can be assembled, delivered and installed at the same time the old drive is removed, reducing downtime, labor costs and crane costs.



A new gearbox (right) is simply dropped into an existing system with minimal downtime.

➤ The SEW-EURODRIVE Advantage

- Our engineers are able to design and supply a transition base to replace almost any gearbox application.
- SEW-EURODRIVE designs already exist for the majority of existing worm gear units in service. This greatly reduces cost and delivery time.
- No site modifications are required as transition bases are designed to match the existing drive's output shaft location and mounting bolt pattern.
- The transition bases are supplied with jacking bolt tabs to aid in the alignment of the output shaft.
- A new coupling half can be supplied on the replacement drive output shaft that matches the coupling on the application. There is no need to remove the coupling from the head shaft.
- It's as simple as unbolting the old gearbox, bolt the new SEW drive system in, connect the wires, and press start!

Problem Solving: Industry Success Stories

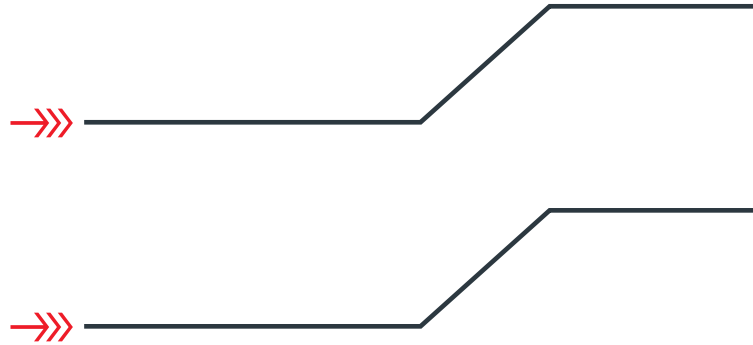
➤ Cement Industry

Problem

The existing travel drive contained mechanical clutches, which constantly failed. Another issue was constant crabbing of the reclaimer due to unsynchronized drives.

Solution

SEW-EURODRIVE's solution utilized electronic speed control without any mechanical clutches. Encoders on the drives provided constant feedback to the speed controllers, ensuring perfect synchronization of all drives and eliminating crabbing. No changes required by the customer.



Before: An open design caused inefficiencies and required continuous maintenance.



After: A more enclosed, high-efficiency drop-in replacement offers better protection from harsh elements.

➤ Coal Industry

Problem

Again, the existing travel drive contained mechanical clutches, which constantly failed. This time the equipment was too low to the ground, driving into spillage piles suffering contamination, which increased the likelihood of failure even further.

Solution

SEW-EURODRIVE's solution utilized electronic speed control without any mechanical clutches, which are sensitive to contamination. The drive was mounted upright to avoid contamination from spillage, while the customer's existing staircase and other structure remained unchanged.



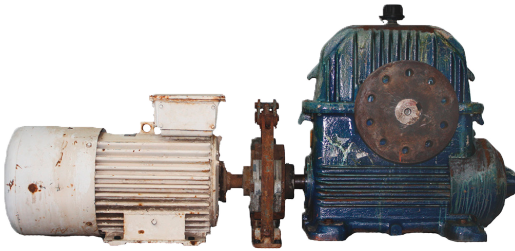
Before: Overall design and placement of equipment decreased efficiency while increasing contamination.



After: An upright mount position adds equipment protection and efficiencies.

Energy Savings

Existing drive system – Overall Efficiency 70%



12-inch worm gear unit with a ratio of 30:1

- Torque capacity: 12,300 Nm
- Efficiency: 85%
- Thruster brake
- 225S frame welded steel motor
- 18.5 kW, 725rpm
- Efficiency: 82%

The existing drive system consists of a worm gearbox, a mechanical brake with a cone ring style brake drum coupling, and a foot mounted motor.

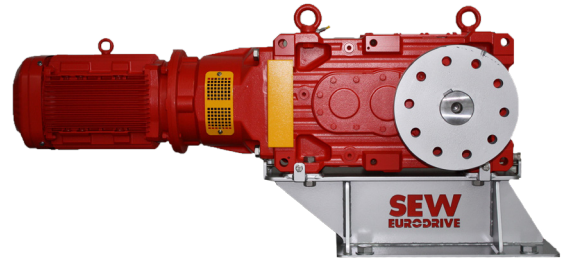
All three components require accurate alignment. The gearbox output shaft needs to be aligned with the application shaft, and the brake requires regular adjustment, maintenance and guarding.

Power Calculations

Assuming the existing system demands the full rated power of 18.5 kW:

- Electrical Input power to the motor to produce 18.5 kW = Motor output power / motor efficiency
 $18.5 \text{ kW} / 82\% = 22.56 \text{ kW}$
- Mechanical Output power from gearbox = motor output power X gearbox efficiency
 $18.5 \text{ kW} \times 85\% = 15.73 \text{ kW}$

➤ New drive system – Overall Efficiency 90%



X3KS120 with a ratio of 61.35:1

- Torque rating: 12,800 Nm
- Efficiency: 96%
- Centrifugal lift-off backstop
- IEC input flange
- DRN180M4 motor
- 18.5 kW, 1478rpm
- Efficiency: 94%

The new drive system consists of a high efficiency helical bevel gearbox, and an IE3 premium efficiency flange mounted motor, and a jaw coupling.

A maintenance free centrifugal lift-off backstop mounted in the gearbox has replaced the brake. A brake motor could be used if a brake is still required.

Power Calculations

Assuming the new system must produce the same mechanical output power as the legacy drive:

- Input power to gearbox = output power / gearbox efficiency
 $15.73 \text{ kW} / 96\% = 16.38 \text{ kW}$
- Electrical Input power to motor to produce 16.38kW = motor output power / motor efficiency
 $16.38 \text{ kW} / 94\% = 17.43 \text{ kW}$

Cost Saving Example

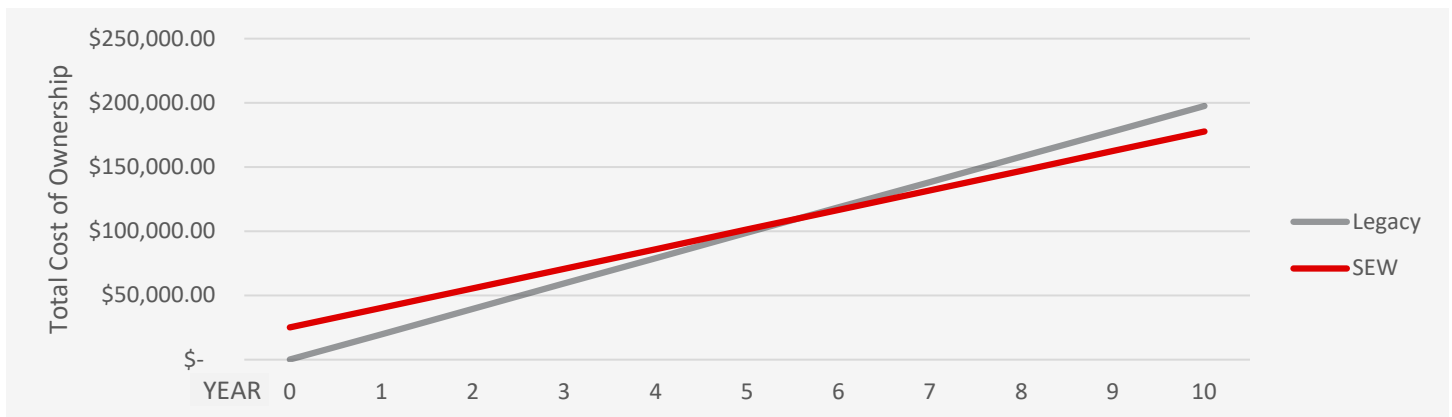
- Old motor input power vs. New motor input power
 $22.56 \text{ kW} - 17.43 \text{ kW} = 23\% \text{ savings}$

This example also saves 41 tons of greenhouse emissions every year.²

Total Cost of Ownership (TCO)

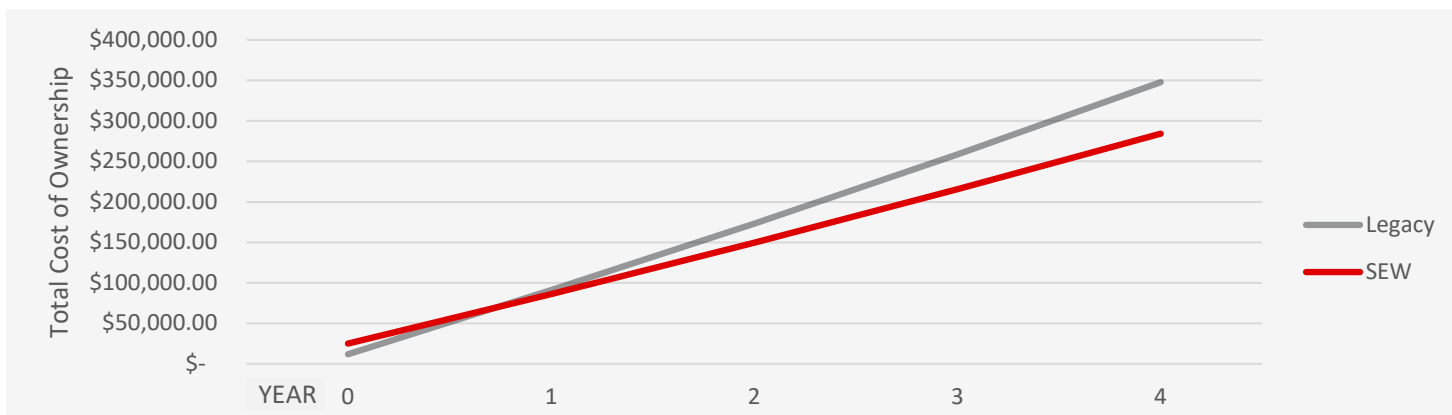
Example 1 (Minimum Savings) ➔ Result: Amortization in 6.5 Years

- Low electricity rate of 0.30 \$/kWh
- Daytime only operations of 8h/day
- No inflation in power prices
- Legacy unit not requiring service

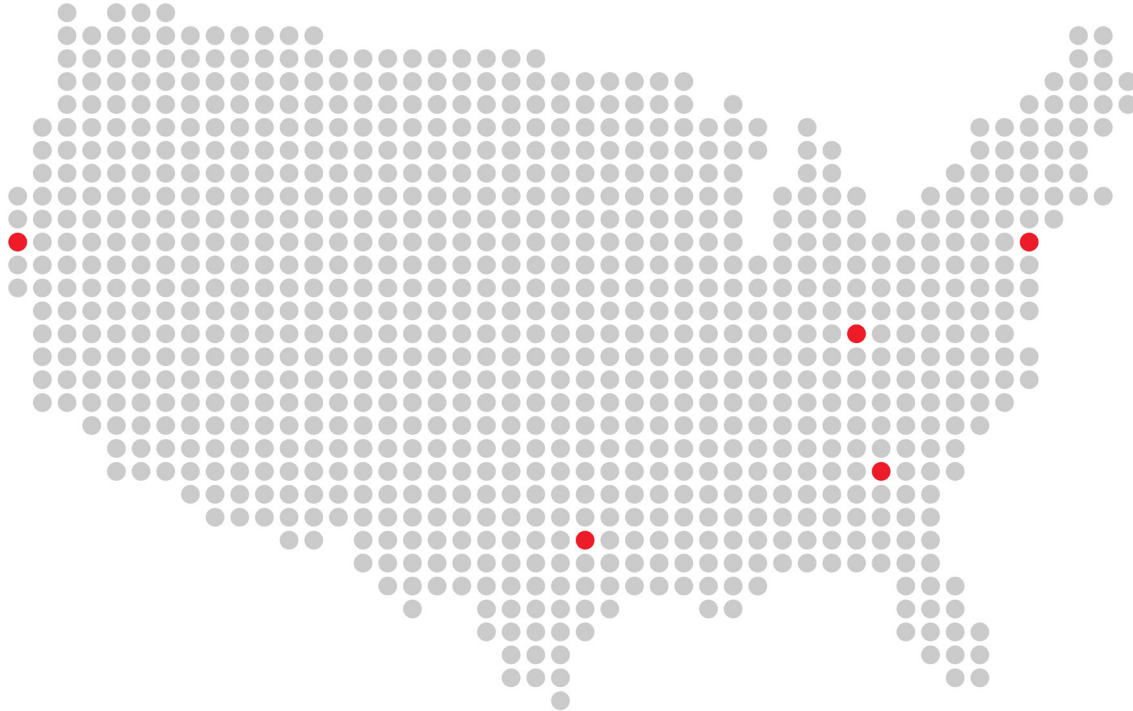


Example 2 (Maximum Savings) ➔ Amortization in less than 1 Year

- Average electricity rate of 0.40 \$/kWh
- Continuous operations of 24h/day
- Inflation rate on power 4% pa
- Legacy unit requiring service



* 1: Average Market Rate for SME Customers varies strongly based on State and Supplier. The estimated range roughly covers the entire range in Australia for the 2023 Calendar Year.
 **2: using a Ratio of 0.92 kgCO2/kWh as per Origin Zero June 2023*



U.S. locations

U.S. Headquarters/Southeast Region

SEW-EURODRIVE, Inc.
220 Finch Road
Wellford, SC 29385
P: (864) 439-7537
cslyman@seweurodrive.com

Southwest Region

SEW-EURODRIVE, Inc.
202 W. Danieldale Rd.
DeSoto, TX 75115
P: (214) 330-4824
csdallas@seweurodrive.com

Western Region

SEW-EURODRIVE, Inc.
30599 San Antonio St.
Hayward, CA 94544
P: (510) 487-3560
cshayward@seweurodrive.com

Midwest Region

SEW-EURODRIVE, Inc.
2001 West Main St.
Troy, OH 45373
P: (937) 335-0036
cstroy@seweurodrive.com

Northeast Region

SEW-EURODRIVE, Inc.
2107 High Hill Rd.
Bridgeport, NJ 08014
P: (856) 467-2277
csbridgeport@seweurodrive.com

Industrial Gears

SEW-EURODRIVE, Inc.
148 Finch Rd.
Wellford, SC 29385
P: (864) 439-8792
igssorders@seweurodrive.com