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## How much money are you wasting by using worm gear motors?

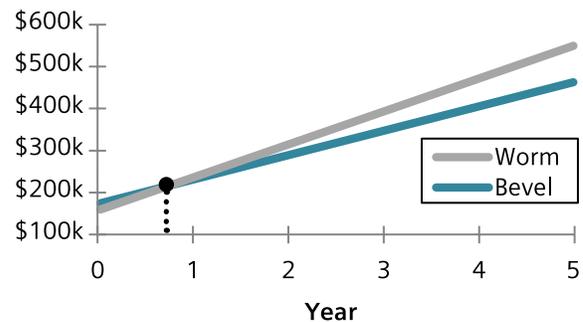
Shaft-mounted right angle gear motors are the new normal for conveyors. When faced with the decision of whether to use a bevel or worm gear motor, you may be tempted to choose the latter, because it is seemingly less expensive and gives you the output speed and torque that you require. What you may not have realized is that worm gears are the least efficient type of right angle gearing, and the associated long-term energy costs far outweigh the initial investment. The example below illustrates why a worm gear motor may not be the best choice.

This conveyor application requires 1.4 HP at the load with an output speed of 53 rpm.

	Helical Worm	Helical Bevel
Initial cost for end user	\$890	\$930
Gearbox efficiency	80%	96%
Required output power	1.4 HP	1.4 HP
Required motor power	2 HP	1.5 HP
Energy cost per year	\$366/year	\$305/year

Now let's extrapolate these results to resemble a more typical scenario in an industrial setting. The figure below shows the total cost of 200 units over 5 years. By using helical bevel gearing instead of helical worm gearing, you would save over \$52,000 with a return on investment of less than 1 year.

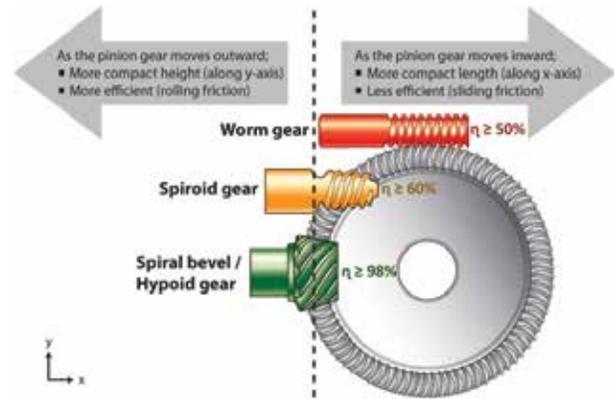
**Worm vs. Bevel Gear Motor ROI**



Assumptions: Both gear motors use the same NEMA Energy Efficient motor, energy cost is \$0.07 per kWh, run-time of 4,000 hrs/yr. Maintenance costs are not included.

### Disadvantages of worm gearing

- Least efficient type of right-angle gearing
- In high run-time applications, the energy costs far outweigh the initial investment
- Energy is lost in the form of heat due to sliding friction between the worm and worm gear
- Efficiency decreases as gear ratio increases, or as output speed decreases
- Efficiency decreases as motor input speed decreases
- Bronze worm gears are designed to wear and must be replaced periodically



Gear type has a drastic effect on efficiency

	Helical bevel gear motors 2-stage (B Series)	Helical bevel gear motors 3-stage (K Series)
Efficiency	Up to 96%	Up to 94%
Output torque (lb-in)	442 to 3,982	1,947 to 14,160
Ratio	3.47 to 59.28	5.17 to 244.25
Motor power (HP)	1/3 to 10	1/3 to 20

### SIMOGEAR helical bevel gear motors

- Mounting options: Foot, flange, and torque arm
- Inch or metric shafts in common dimensions
- Shaft types: Solid, hollow, and SIMOLOC
- Gear teeth hardened and ground for infinite life
- Synthetic oil standard for longer maintenance intervals
- Aluminum housings are lightweight and do not require paint
- Inverter-duty NEMA Premium® and NEMA Energy Efficient motors (230/460VAC, 60Hz)
- Conduit box with NPT-tapped holes
- Standard 9-pin terminal block in 3x3 configuration



### Easy installation

- SIMOLOC keyless tapered shaft locking system allows for easier installation on hollow shaft applications
- An integrated mounting flange is incorporated into the gearbox housing, however other common flanges are also available

### E-readable

- RFID nameplates allow for quick identification, while Smart Numbers make ordering of exact duplicates effortless

### Field modifiable

- MODULOG modular concept uses various mounting shafts to add options such as brakes, encoders, and external fans that can be field-retrofitted after installation



### The power of 2%:

Our SIMOGEAR 2-stage helical bevel unit gives you higher ratios in the first gear stage than traditional designs. All told, the unit averages 2% higher efficiency than 3-stage units. For any continuous duty application, that translates to substantial energy savings over the long term.

NEMA Premium® is a certification mark of the National Electrical Manufacturers Association. (US DOE CC# 032A)

Siemens Industry, Inc.  
3333 Old Milton Parkway  
Alpharetta, GA 30005  
1-800-241-4453  
info.us@siemens.com

Subject to change without prior notice  
Order No.: MDFL-00001-0713  
Printed in USA  
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