



# WHAT COULD BE BETTER THAN NO TROUBLE?

CASE STUDY: LEGG MANUFACTURING





**Industrial & Ag Industry**  
Calendar Drives



**Large Industrial Gearing**  
SK 15307V



**Optional Accessories**  
Coupling Guards &  
External Oil Coolers

## What Could Be Better Than No Trouble

Legg Company has come a long, long way since the 1930's, when expertise in making rubberized patches for agricultural binder canvasses led the company into the manufacture of industrial belts. From those humble beginnings in Halstead, Kansas, the company has grown to become a well known supplier of industrial and agricultural belting. Now a part of the Continental Group, Legg serves the market with its innovative and diverse product line.

On the manufacturing floor, NORD has been a part of Legg operations for decades. It all began in 1992, when San Nikkel joined the company as maintenance supervisor. Today he's in charge of R&D and Engineering. In 1996 San faced several difficult challenges with rewinder drives at Legg. "They had a very simple mandrel, with plain shafts with plain ends," San explained. "If a chuck failed, the entire shaft and roll could fall to the floor. It was a dangerous situation that had to be resolved. I examined several different chain drive options, and rejected them all. I knew that chain maintenance would be a problem. Then I saw an ad for NORD drives, and explored that option. I wanted the bearing journals to be on the mandrel, and did not want to have to dismantle the bearings to take the roll off. I needed a drive with a hollow shaft, and the NORD unit was just the ticket. And with all the reduction in one gearbox, without any kind of chain drive involved, it really simplified my maintenance challenges." To say that was the beginning of a beautiful relationship is

perhaps an understatement. Today, almost every drive in the Legg plant is a NORD. "I'd have to go out and count them, but I know we have well over 50 NORD drives in this plant," said San. "They are terrific drives, absolutely dependable and maintenance free. So you just kind of forget about them. We've never had any kind of a problem with any of them." One system particularly impressed San. "We had a system upset and the line stalled. But before we were able to shut it down, the NORD drive on the rewind stand kept turning. It twisted 1/4 turn into a 3" diameter solid 1045 steel shaft, and the drive did not fail. That's pretty amazing." Regarding his longstanding loyalty to NORD drives, San sums it up nicely... "What could be better than no trouble?"

In 2011, Legg decided to expand their production capabilities with the addition of a new calendar unit. And it was to be of massive size. The calendar functions to layer rubber onto fabric in order to manufacture conveyor belts. Their existing calendar produced 6' wide belts, but the concept behind the new unit was to produce 8' wide belts, substantially improving manufacturing efficiencies. The gigantic calendar frames required were found, but the rest of the calendar needed to be custom engineered and built from the ground up. Legg planned to use their own engineering and maintenance staff to do the construction, but enlisted the help of engineering consultant Larry Gooch to work with them on the design.



[www.nord.com](http://www.nord.com)



*"I needed a drive with a hollow shaft, and the NORD unit was just the ticket. And with all the reduction in one gearbox, without any kind of chain drive involved, it really simplified my maintenance challenges." San Nikkel, Legg Industries*



*Thermal load management required a central remote oil reservoir connected to the calander drive.* →



Larry engaged in this project with great enthusiasm, and knew he faced significant challenges when it came to the drive systems required for a calendar of this scale. “Quite honestly, I was not even thinking of NORD when I started exploring drive options for the four, 32” diameter rolls,” said Larry. “But the folks at Legg strongly suggested that I explore a NORD solution, due to their excellent experience with NORD drives over the years. So I took a look at NORD MAXXDRIVE™ Large Industrial Gearboxes. Given the power requirements and space constraints that we faced, they looked like very viable solutions.” Larry worked with Legg engineer Ken Burbrink, NORD application engineering manager Eric Haugen, NORD district sales manager Greg White and NORD distributor IBT, Wichita to devise the uniquely integrated drive system that ultimately evolved.

“I wanted to avoid long drive shafts, so we needed to be able to stack the four drives in a unique way. The fact that this had never been done before did not deter NORD engineering in the least. In fact, Eric and the application engineering group regarded it as an exciting challenge, and went to work” explained Larry.

NORD engineering responded quickly, working standard MAXXDRIVE™ boxes into a decidedly non-standard configuration. According to Eric Haugen, “this was a very unique in-

stallation, requiring custom engineering of the standard drive units. We determined that the MAXXDRIVE™ SK15307V NE-MA449TC drives would do the trick, but some customization was required. Since the drives needed to be stacked 3-high, with the fourth off to the side, we needed to insure the gear case mounting was supported sufficiently to accommodate the bending moments, especially as these affected the bottom case. Additionally, the thermal loads were such that we devised a central lubrication system that feeds from a remote reservoir.

Regarding the stacking, Eric offered further insight into how NORD assured easy installation and reliable operation with our universal housing. “Once the drives were manufactured, we actually constructed the stacked assembly in Germany to assure that all bolt holes lined up properly, and that everything worked as promised in that stacked configuration. We wanted to be 100% positive that installation would be easy for the Legg staff. This customization and this kind of attention-to-detail care is what being in a multi-partner project is According to Larry Gooch, multiple drives and the stacked configuration presented some significant engineering challenges. “In a single-drive calendar system, power automatically distributes itself to where it is needed in each roll. Here, we had to calculate maximum load requirements for each roller, and make sure the drive could deliver, with power to spare. Also, we worked closely with NORD on custom bracing for the 3-high stacked



← *The NORD Drives are stacked 3-high, with a fourth of to the side. This presented unique mounting challenges.*



### FOCUS ON CALENDAR DRIVES

**NORD Large Industrial Gear drive units:**  
MAXXDRIVE™ Helical-Parallel Shaft Design

**Unit type:** SK15307V-NEMA 449TC /

**Ratio:** 80.10:1

**Input Speed:** 1170 RPM

**Output Speed:** 15 RPM

**Torque Rating:** 1,850,000 lb-in.

### Ctd:

configuration. Significant overturning moments were going to occur, especially on the bottom box. The cast iron construction takes compression loads quite well, but we wanted to make sure that attachment flanges were not over-stressed.”

Both Eric and Larry were also highly complementary regarding the Legg staff. “In my experience, it is very unusual for a customer to utilize their own personnel to actually do the installation,” said Larry. “The Legg staff was really amazing in how they built the entire calendar. It was really fun working with these very talented and dedicated people.”

The Legg calendar is designed so that each roller is individually driven by a NORD drive. This allows for more precise process control. Additionally, the use of NORD drives is not limited to the calendar on this line. The same size drives that power the calendar are also used upstream on both the warm-up and finishing mills that then feed rubber to the calendar. Downstream, additional NORD drives power multiple rewind stands.

So, how are things going? To quote San Nikkel once again, “What could be better than no trouble?”



### About Legg Company:

As part of the Continental Conveyor Belt Group, the Legg conveyor belt line adds depth and breadth to the product range and continues the promise to bring quality-engineered solutions that meet the needs of every customer, in every application.

At their Halstead, Kansas manufacturing facility, Legg produces a comprehensive line of conveyor belts. These belts are quality engineered to meet a variety of everyday applications, or specially engineered to customer specifications. The Legg belting line is the result of a commitment to excellence and a dedication to quality that runs deep. Their legacy speaks for itself; since 1939, Legg has been serving the needs of a variety of industries by providing technology-based solutions that answer specific conveyor belting needs.

Their philosophy is simple: Build the highest quality product using the best raw materials, the best manufacturing processes, the best personnel and the best distribution network. Their ultimate goal is to ensure the satisfaction of their customers by servicing them like no one else in the industry.

## MORE REFERENCES AND CASE STUDIES MAY BE FOUND AT :

- [www.nord.com/references](http://www.nord.com/references)



**NORD Gear Corporation**  
MEMBER OF THE NORD DRIVESYSTEMS GROUP  
[info.us@nord.com](mailto:info.us@nord.com)

**Waunakee, WI**  
800 NORD Drive  
Waunakee, WI 53597  
Tel. 608.849.7300

**Corona, CA**  
1180 Railroad St.  
Corona, CA 92882  
Tel. 608.849.0190

**Charlotte, NC**  
300 Forsyth Hall Dr.  
Charlotte, NC 28273  
Tel. 608.849.0140

**NORD Gear Limited - Canada**  
MEMBER OF THE NORD DRIVESYSTEMS GROUP  
[info.ca@nord.com](mailto:info.ca@nord.com)

**Brampton, ON**  
41 West Drive  
Brampton, ON L6T4A1  
Tel. 800.668.4378

### Global Vision, Local Support

NORD makes its wide product range easily available through a global network that includes representation in over 60 countries. By providing all of our customers with prompt delivery, and expert support services, we are firmly committed to exceeding customer expectations and being responsive to the ideas and specifications of every customer, anywhere in the world.

