

*Material handling management-*

# A Unique Conveyor System Helps Parducci Winery Increase Production and Reduce Downtime

by Co-Publisher J. William Moffett

**S**ales of Parducci wine were increasing, but the sight of grape gondolas backed up along the drive to the crusher, waiting to unload, was not a happy sight to Bill Parducci.

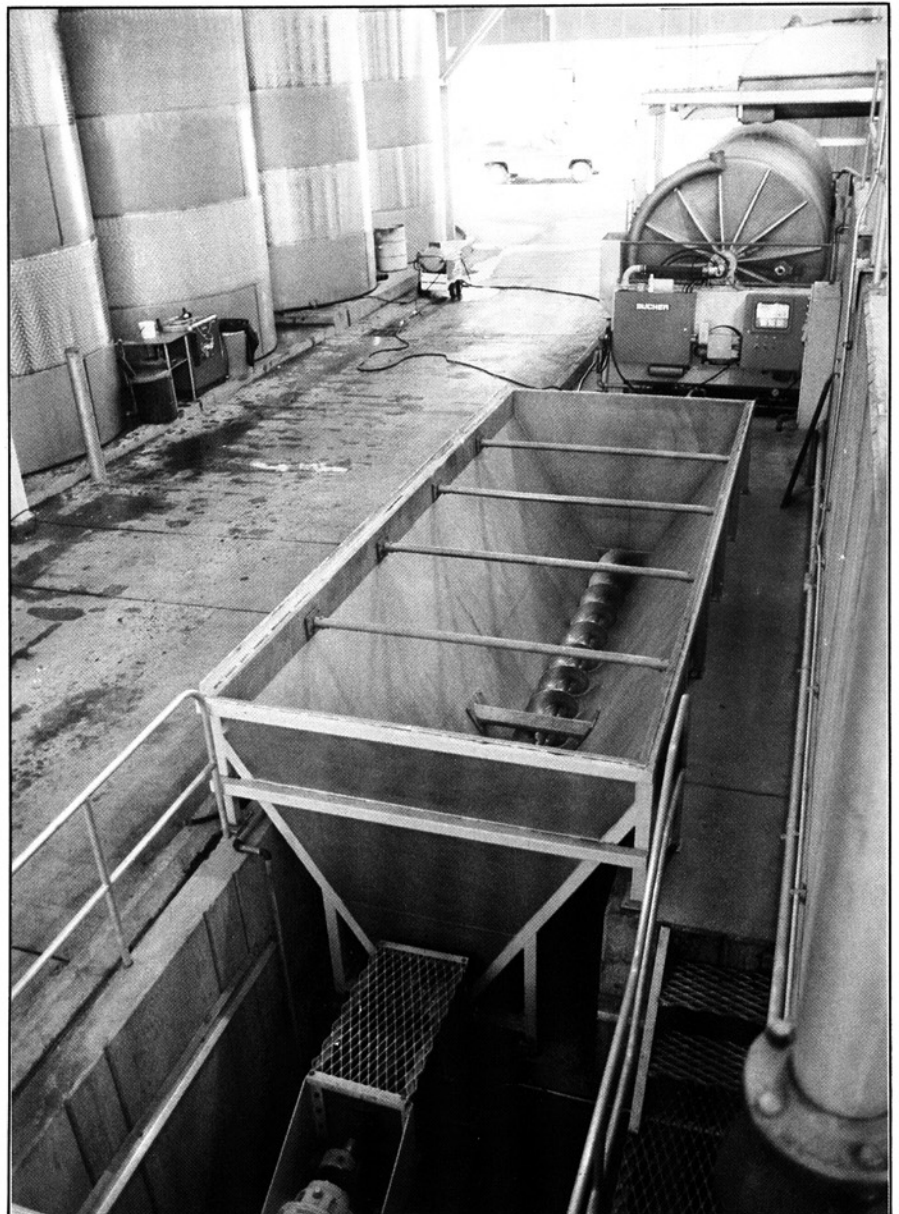
Assistant general manager of this fourth generation Ukiah winery, Parducci knew that the demand for quality meant getting the grapes through the crushing facility quickly. He also knew that speed-up translated into dollars saved. White Zin was booming and the time had come for change. So in 1987 the winery began a 30,000 square foot expansion that by 1990 had thoroughly modernized this Mendocino County facility.

In all, the addition contains 23 fully-jacketed stainless steel fermenters and seven dejuicing tanks, two stemmer-crushers, two new presses capable of processing 50 tons of grape per hour each, and a series of specially-designed screw conveyors to move grape material more effectively, designed and built by Martin Sprocket and Gear, located in Arlington, Texas.

The key elements of the system are drain and fermenting tanks by Santa Rosa Stainless Steel, and screw conveyors by Martin Sprocket and Gear, who designed the entire assortment of delivery conveyors according to the flow plan desired by Parducci. Martin Sprocket's know-how for this type of job, Parducci said, brought the winery a highly efficient system for moving crushed grapes and pomace through the crush pad with greater flow, increased safety, easier clean up and less downtime than with many comparable systems.

## How it works

The facility was going to be built in a canyon adjacent to the existing operation, and Parducci wanted to crush grapes and pomace downhill as much



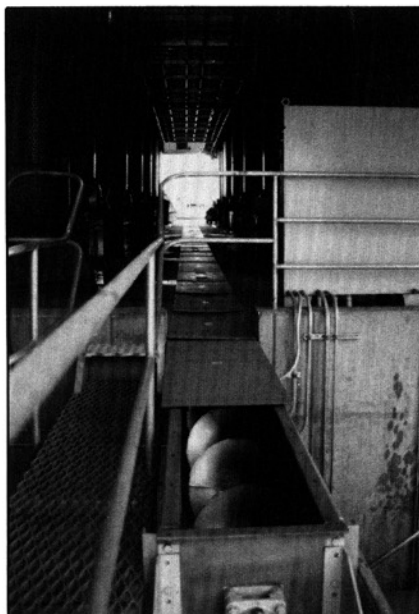
*Grapes are received by a Martin Sprocket custom hopper and screw conveyor, which feeds dejuicers and a 50-ton press at Parducci.*

as possible rather than up. He wanted it so grape gondolas could pull in on one side to off-load red wine grapes or drive through and re-enter from the other direction to dump whites, all the time under cover. In between the two dumping stations would be jacketed fermenting tanks for red and white wines, 10 for white and 13 for red, all installed under an open-ended, insulated building.

A single dejuicing tank feeds the red wine press, while six dejuicers feed the white wine press. Each press pad is controlled from a centrally-installed panel having clear sightlines to each station of the must and pomace transfer points. The panel was built with OSHA-required lockouts for each worker on the pad, to insure safety of operation.

On the upper side of the white wine half of the receiving station Parducci placed six 15,000-gallon dejuicing tanks situated above the press. At grade was a grape receiving hopper into which trucks could dump their grapes. The major design task was to get the grapes into the crusher safely and fast, through the crusher, and then into the six drain tanks. Martin Sprocket's engineers assessed the problem and came up with a receiving hopper designed to eliminate a fault encountered in some systems, that of grapes bridging and not feeding to the crusher. Parducci was anxious to see this problem get solved since it has proved to be an industry safety concern. Parducci knew from experience that the expeditious way to dislodge jammed grapes, especially when trucks are lined up on the pad eager to dump, is to send a man down into the hopper, a dangerous practice if operators are not fully aware. As an improvement, Martin Sprocket designed Parducci a stainless steel receiving hopper with sides sloped at 60° rather than the more customary 30°. The hopper was reinforced with heavy channel steel along the sides and built with struts across the top to prevent bulging and carry the strain of tons of grapes. Each hopper is 20 feet long, seven feet deep and eight feet wide. At the bottom of the hopper is a Martin Sprocket stainless steel screw conveyor that moves the grapes to a pit at the end of the hopper and into a 50-ton per hour Healdsburg stemmer-crusher. A Healdsburg two-piston, positive displacement pump moves the crushed grapes up through a four-inch line to one of the drain tanks above the press. From the crusher pit, stems are transported by a tubular screw conveyor out into a truck for disposal.

For stem removal, Martin Sprocket designed a conveyor where stems climb on screws that are clocked for continuous helix and utilize ultra high molecular weight (UHMW) flight edging to reduce wear and eliminate the need for intermediate hanger bearings.



*This in-floor conveyor sluices pomace to the red wine press.*

Parducci finds this to be a tremendous advantage over the former pneumatic conveyor the winery used, which frequently plugged and required unscheduled downtime and additional maintenance. A unique aspect of the conveyor is the installation of hold-down shear angles on the upside turn of the screws. This plate shears grape stems into small pieces and prevents them from wrapping themselves around the screw pipe and possibly plugging the tubes. The motors on all conveyor systems are located at the open end to make servicing easiest.


Operation of the stem conveyor, as well as distribution of the must line, is governed by the operator at the control panel of the pressing station. He can similarly unload any of the dejuicers as well as operate all the conveyors.

The six drain tanks, each capable of holding 50 tons of grapes, serving the 50-ton Bucher programmable pneumatic press, were designed to meet the demands of processing the winery's anticipated harvest with greatest efficiency. Tying the system together at this level is, again, a Martin Sprocket-designed conveyor. Here two deep trough conveyors receive juice and crushed grapes through 16-inch knife valves on the dejuicers, which are controlled at the operator panel. The trough extends from both ends of the system to the middle, using right and left screws, and feeds a short conveyor, which is turned 90° to the troughs, to load the press. Martin Sprocket designed it for operation ease and efficiency as well as complete cleaning. Both ends of the trough are sloped two degrees to be self-draining, as is the cross-conveyor, and the conveyor itself is suspended from adjustable intermediate hanger bearings,

which allow the entire screw to be lowered in the trough for complete removal of solid matter as well as to compensate for eventual wear of the flights. The sanitation of the conveyor process was assured by elimination during design of any nooks and crannies where grape material could lodge and cause sanitation problems.

The next area where conveyors come into play is in the removal of pomace from the press. The 50-ton Bucher dumps into a hopper from which a tubular trough conveyor, also designed and built by Martin Sprocket, extends. The design problem was to move material out of the pit at a 45° angle and raise it some 40 feet to a position 12-feet above grade. Here a truck would receive and take the pomace back to the vineyards. Short pitch, inclined screw conveyors were used to steepen the angle of the screw flights, together with a cone screw concept intended to widen the pitch and eliminate bridging of the material as it entered the system. Intermediate hanger bearings were eliminated and UHMW flight edging was again employed to provide friction minimization. Beefed up horsepower and higher rotation speed is combined to prevent roll-back of the pomace and to make sure it gets booted out the precipitously uphill chute!

On the red wine side a similar labor and cleaning efficiency concept is used, but with grapes flowing to a single dejuicer or to red wine fermentation tanks, depending on whether red or blush wine is to be made. But here all red wine pomace after fermentation discharges into a central 18-inch Martin Sprocket conveyor located under the floor aisle between 13 14,000 gallon stainless steel jacketed fermenters manufactured by Santa Rosa Stainless Steel. The conveyor leads the pomace to a second 50-ton Bucher automatic press, which is emptied and discharged in essentially the same manner as on the white wine side.

For Parducci, already a 330,000 case winery, the system was designed to carry them well into the 500,000 case range without costly re-expansion and without extensive labor or time contributions along the way. Parducci says the combination of closed system handling and efficient conveyance already has paid for itself in terms of improved wine quality and definitely cooler tempers at crush. It was the right thing to do! 

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