

CASE STUDY

Machining Company Achieves Considerable Cost, Space and Labor Savings with a PRAB Crusher/Wringer System

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Rod Anthony, President, Anthony Screw Products Ltd.

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Anthony Screw Products Ltd. is a precision machining company located in Burlington, Ontario, Canada. The company utilizes automatic multi-spindle machines, CNC lathes and mills, and rotary transfer machines to produce a wide range of custom parts including mining, tank and hydraulic fittings, washers, nuts, bolts, pulley hubs, and speaker parts.

The privately owned, family-run business began in 1978 with just two multi-spindle automatics in a 5,000-square-foot workspace. Today, the company operates in a facility that is more than four times the size of the original location and runs nearly 10 times as many multi-spindles.

Prompted by a move to a new building, company president Rod Anthony and Ken Baxter in plant maintenance re-evaluated Anthony Screw Products' chip processing and fluid recovery system. A small chip spinner

(made by a PRAB competitor) had been used for 12 years. It stood vertically on a ball joint and springs, which needed to be replaced annually. Because of the spinner's orientation, the equipment relied on gravity to recover oil from the chips and feed scrap bins. This process was not ideal for a number of reasons:

- **Close to 50%** of the oil in the chips was not being recovered.
- The plant was **only getting a 10% return** on reclaimed oil (at best).
- The chips were so heavily coated in oil that they were not bringing maximum value from the company's scrap dealer.
- Gravity-feeding the bins required several extra dumpers, which took up valuable floor space.
- Dumping the chips daily into an outside bin was messy and expensive.

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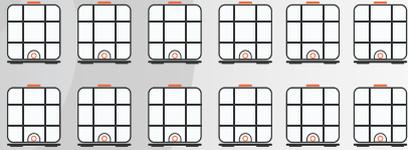
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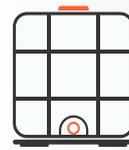
Oil Purchasing Comparison

OIL CONSUMED BEFORE PRAB



12 TOTES
IN 6 WEEKS,
a cost of \$27,000

OIL CONSUMED AFTER PRAB



1 TOTE
IN 6 WEEKS,
a cost of \$2,250

SAVINGS

6 WKS \$24,750

ANNUALLY OVER \$212,000

1 TOTE = 1,100 LITERS

Due to the excessive maintenance, loss of value from materials and general housekeeping issues—the latter being especially undesirable for a company that prides itself on maintaining a clean, efficient, and very well-organized plant—Rod didn't even bother bringing the old spinner to the new facility. It did not have a shredder and it was not possible to add one to it either. In its place, he wanted an equipment solution that could reduce the size of steel turnings, reclaim the excessive amount of residual cutting oil being lost, and discharge processed chips into a covered roll-off container.

Rod did some investigating on chip spinners with other customers, went looking for solutions and decided on a complete automated chip processing system from PRAB. He knew the PRAB system was the right one for him.

PRAB's proposed system included a high-level automatic cart dumper that would feed long, stringy turnings into a vertical axis crusher to reduce them to flowable chips. Next, a steel-belt wringer feed conveyor would collect crushed chips and elevate them to a tramp metal separator for removal of accidentally ingested solids. Then, a diagonal shaft chip wringer would separate oil from the chips with more than 600 G's of centrifugal force before pneumatically discharging the dried chips into a covered roll-off container.

Finally, a settling tank would capture reclaimed fluid and transfer it to a holding tank or a separate filtration system, while a re-circulating drag conveyor would return fines to the chip flow to help keep the tank clean. The proposal also included options for loading a second container and filtering the reclaimed oil prior to transferring it to a tote, a bulk storage solution that holds 1100 liters of cutting oil.



In six weeks, I was buying 12 totes worth \$27,000. Now, in the same six weeks, I buy one tote worth \$2,250. That is a savings of 11 totes, or \$24,750 in six weeks alone. Over \$212,000 a year in oil savings. I am in shock along with everyone else in my plant.



In less than a week after Rod approved the equipment, the PRAB team had it in place. Anthony Screw Products quickly began seeing a return on investment that remains pleasantly surprising nearly a year after the implementation of the system.

Extracting more oil from the chips is also paying off with Rod's scrap dealer. "On average, he is giving me an additional 15 percent in value for dry chips instead of wet chips. That adds up to roughly \$24,000 to \$28,000 per year."

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Leaving money on the table because of ineffective chip processing and fluid recovery is now in the past for Anthony Screw Products. Wasted floor space because of the large number of totes, housekeeping issues caused by oil on the floor, and constant equipment maintenance have also been eliminated by the PRAB system.

“Before the new system, I was gravity-draining the chips, and we had a lot of extra dumpers hanging around taking up space—at least a total of 70 dumpers instead of 30,” Rod said. “Plus, we had to dump the chips daily into an open bin outside. The handling of the chips was costly and making a mess. With fewer bins sitting around, customers always comment about how clean our operation is.” Rod added that

compared to replacing the competitor's spinner's ball joint and springs every year, the PRAB solution is virtually maintenance-free.

With more than 25 years of experience working in every position in the plant's manufacturing process, Rod has a unique and total understanding of the operation. After partnering with PRAB, he has a new appreciation for the value of recycling.

“Costs were killing me before I received the new PRAB system,” Rod said. “I knew recycling was important to the environment, but I never considered it from the standpoint of efficiency and cost savings. But now, I realize it should be one of the first pieces of equipment you look at to solve problems in those areas. It just makes complete sense.”

Application Information

Material Handled	1215 Steel
Fluid:	Oil
Chip Configuration:	70% chips, 30% turnings
Bulk Density:	Estimated at 38 lbs/ft ³
Current Volume of Material:	30,000 lbs/week (estimated at 300 lbs/hr max)
Target Volume of Material:	80,000 lbs/week (estimated at 800 lbs/hr max)
Tramp Metal Solids:	Infrequent: Customer to screen out solids/tramp metal before material is brought to PRAB system (Note: Max allowable size in PRAB system is 1.5" diameter x 4" long)
System to be fed by:	Chip carts
System location:	Inside plant
Plant Power Supply:	480VAC/3/60
Power Consumption:	61 total amps, 42 total H.P.

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PRAB Crusher/Wringer System Summary

High-Level Automatic Cart Dumper

- Accepts chip carts up to 28" wide and 42" long
- Lifting capacity: 1,500 lbs
- Cycle time: 180 seconds

Vertical Axis Crusher: Model VAC II

- Uses low-speed crushing/tearing forces to reduce long, stringy turnings into shovel-grade chips

Wringer Feed Conveyor: 2.5" Pitch Steel Belt

- Collects crushed chips, elevates and meter-feeds material into the tramp metal separator

Tramp Metal Separator: Model R24

- Rotates controlled amounts of chips across a generated air-stream for effective removal of accidental bar-ends, tramp metal and other solids up to a maximum size of 4" long x 1 1/2" diameter
- Protects the wringer for extended service life

Diagonal Shaft Chip Wringer: Model 24AD

- Uses centrifugal force to separate oil from metal chips
- Pneumatically discharges dried chips through 5" diameter piping into the customer's covered roll-off container

Settling Tank with Re-Circulating Drag Conveyor

- Captures reclaimed coolant for recycling
- Provides automatic recirculation of fines back into chip flow to help maintain a clean settling tank
- Includes a pneumatic pump to transfer the captured fluid to a holding tank or a separate filtration system

Control Panel

- NEMA 12 cabinet engineered and constructed to control all items in the system with motor-starters, over-loads, contactors, fuses, HMI and PLC
- PRAB/Unitronics controls
- CUL compliant
- Pre-wired

System Start-Up & Training

- A fully trained PRAB service technician on-site after the installation is completed to start up and fine-tune the system and train personnel in the proper operation and maintenance of PRAB equipment

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Optional PRAB Equipment Summary

Pneumatic Packet for Second Discharge Point

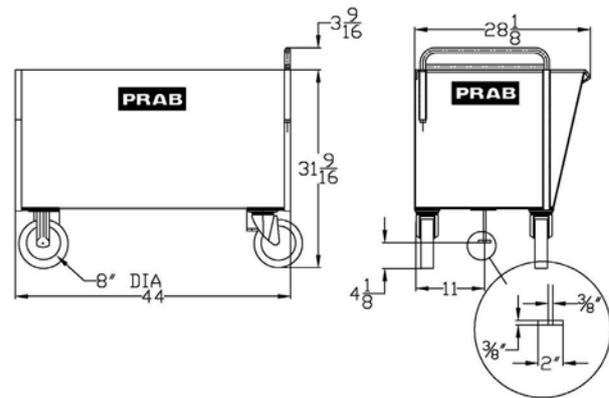
- Pneumatic diverter, additional pipe run and a second manually extending discharge
- Enables uninterrupted operation while the alternate roll-off is removed and replaced

Step Down Polishing Filter System

- Two double-length cartridge filter housings constructed of mild carbon steel
- 100 PSI pressure rating, quick swing closure with eye nuts, 2" inlet and outlet, pressure gauges, vents, drain valves
- First cartridge filter is rated for 50-micron clarity
- Second cartridge filter is rated for 20-micron clarity
- Includes all necessary piping, pressure gauge, drain valve, vent and mounting hardware

PRAB Chip Carts: Model HW-134-8

- Capacity: 13.4 ft³
- 3/4" drain plug
- Load rating: 1,500 lbs



About PRAB

PRAB is a leading engineer and manufacturer of conveyors, chip and fluid management systems, and industrial water and wastewater treatment equipment. Our customized solutions automate metal handling, reduce labor costs, reclaim and recycle expensive cutting fluids/coolants and maximize return on recycling metals. With our expertise, honed by more than 4,500 installations for the world's leading OEMs and suppliers, PRAB continuously improves material handling, housekeeping and compliance to environmental rules and regulations within the automotive, aerospace, medical, electronics, defense, off-road and energy markets. For more information about PRAB, visit prab.com.

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