

VAC-U-MAX

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APPLICATION REPORT

Customer Name: Master Machine

Location: Hutchinson, KS

Sale Year: 2002

Job#: 4229223

Description: Travelling Vacuum System for Metal Chips and Coolant



Basic List of Equipment:

- 7.5 HP High-Flow Positive Displacement Vacuum Pump
- Z65410/01 Intercept Assembly
- 40 Ft. Monorail Frame with Hose Festoon System
- Hoses and Cleaning Ttools

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The Application / Challenge

A manufacturer of specialized machine tools required a company to engineer and manufacture a stationary high-pressure vacuum system to collect steel chips generated by a horizontal keyway cutter. In the past, the chips generated by this process accumulated on the way covers and all along the length of the bed that required too much manual attention and housekeeping and impeded the quality control process. The machine tool consisted of two parallel keyway cutting heads that traveled over 40ft to cut the full-length keyways in shafts used in downhole petroleum pumps. Two shafts were machined simultaneously and the vacuum system needed to capture the chips from both cutters “at the source”. The steel chips needed to be collected in a convenient forklift hopper at one end of the machine tool. The machining process also included coolant that not only needed to be collected by the vacuum system; it was required to separate the razor-like chips from the coolant prior to discharging the chips. The final requirement was to integrate the vacuum operation with the machine tool controls for automatic operation. The equipment was ultimately destined for Southeast Asia so the design needed to be conservative and require a minimum of service.



FIG. 1

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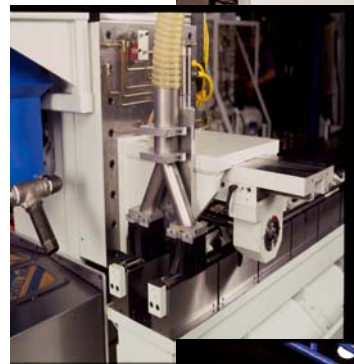
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The VAC-U-MAX Solution

VAC-U-MAX determined that the two 2" pickup ports (see FIG. 2) specified by the customer would require a high-airflow positive-displacement vacuum pump (see FIG. 3) for the best combination of vacuum and airflow for the steel chips. The destructive nature of the razor-like chips was a problem for any vacuum hose but the long travel distance of the cutting head required a flexible component somewhere in the system. The solution was to design a wet/dry intercept assembly that would be mounted on, and travel with, the cutting head so that the chips and coolant would travel a minimum distance and then be separated from the airstream—there would be no tortuous bends in the hose for the chips to clog or to cause wear points. The hose between the intercept and the vacuum pump only carried airflow—no chips—so this highly-flexible hose could be "festooned" to allow the cutting head to travel 40ft while the hose extends and retracts accordingly

The custom intercept assembly was designed with a screen-deck floor to separate the coolant from the collected chips. The coolant is then drained through a solenoid-operated ball valve on the side of the intercept. The chips are automatically discharged through a full-width door (see FIG. 4) that opens when the intercept returns to its "home" position. The intercept discharges chips without operator intervention into an open-top forkliftable bin for easy disposal. The intercept is fitted with a steel mesh filter to withstand liquids and chips.

VAC-U-MAX also supplied the monorail assembly (see FIG. 1) with stanchions to support the festooned clean-air hose over the entire 40ft travel distance.



— FIG. 2



FIG. 3 —



— FIG. 4