



Field Services Report

Relative Alignment of Compressor Train Sole Plates

Abstract

WARMMAK Inc. was commissioned to measure the relative alignment of the compressor train sole plates before grouting. The horizontal centerlines were aligned using string methods and the maximum deviation from a straight line was $\pm 1/32$ inch. The vertical alignment was set to within ± 0.005 inch in accordance with offsets provided by plant personnel. The total span from the compressor to the motor was 278 inches.

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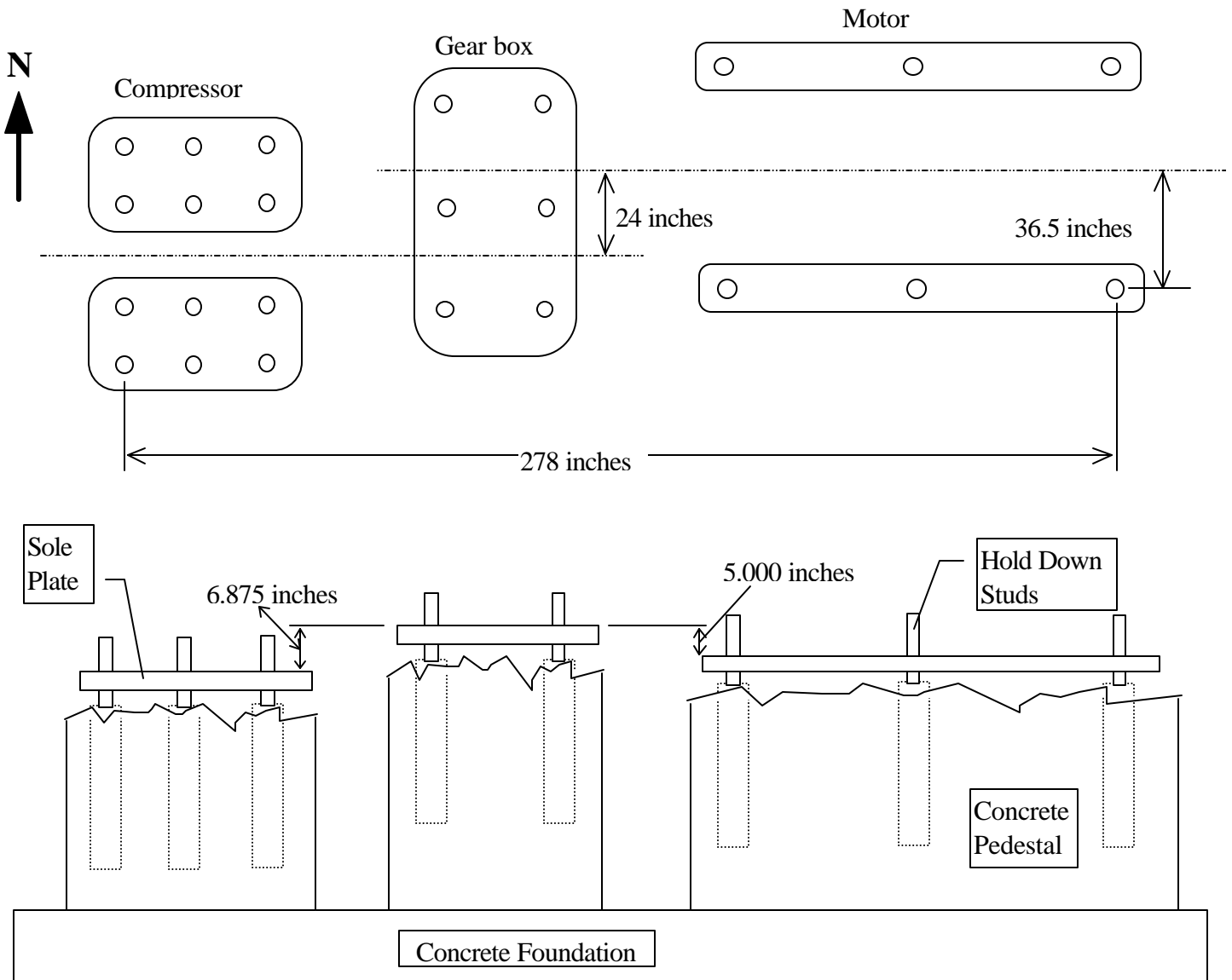
Scope

WARMAK Inc. was commissioned to supply personnel and equipment necessary to measure the relative alignment of the compressor train sole plates.

Background

The references used for absolute location were surveyor bench marks transferred to the concrete pedestals. Accuracy typical to land surveying is ± 0.01 foot. There were no base plates. The sole plates were to be directly mounted to the concrete with grout and hold down studs set in pipes in the concrete.

Sole Plate Configuration



Procedure

During preliminary alignment it was determined that the recommended methods for sole plate placement were unstable and the tolerances would require an additional amount of time not available. At this point in the alignment procedure it was decided to hard shim the sole plates to the concrete and after alignment land the equipment on the sole plates before grouting to check for bolt bind.

The relative horizontal centerlines were measured using string methods and machinist scales. A centerline reference was established from a 12.5 inches offset from the south east motor sole plate to the centerline of the compressor. Reference marks were scribed in the sole plates to facilitate alignment. The reference marks were used for the horizontal alignment. The axial alignment was determined during initial layout and pouring of the pedestals.

The relative sole plate elevation was measured using optical methods. A scale was placed near each hold down stud and the relative height measured and recorded. The gearbox sole plate was referenced to the surveyor bench mark transferred to the side of the pedestal and leveled using spirit levels.

Then the sole plate was leveled using optical methods. The gearbox sole plate was used as the reference for offsetting the remaining sole plates. The average elevation of the gearbox sole plate was calculated for the offset reference. The optical instrument had to be moved during the remaining sole plate elevation offset so different average gearbox sole plate elevations are used for calculating the target relative elevations of the remaining sole plates.

The motor sole plates were narrow, 8 inches or less, so the transverse level was established using spirit levels with graduations of 0.005 inch/foot slope.

Results

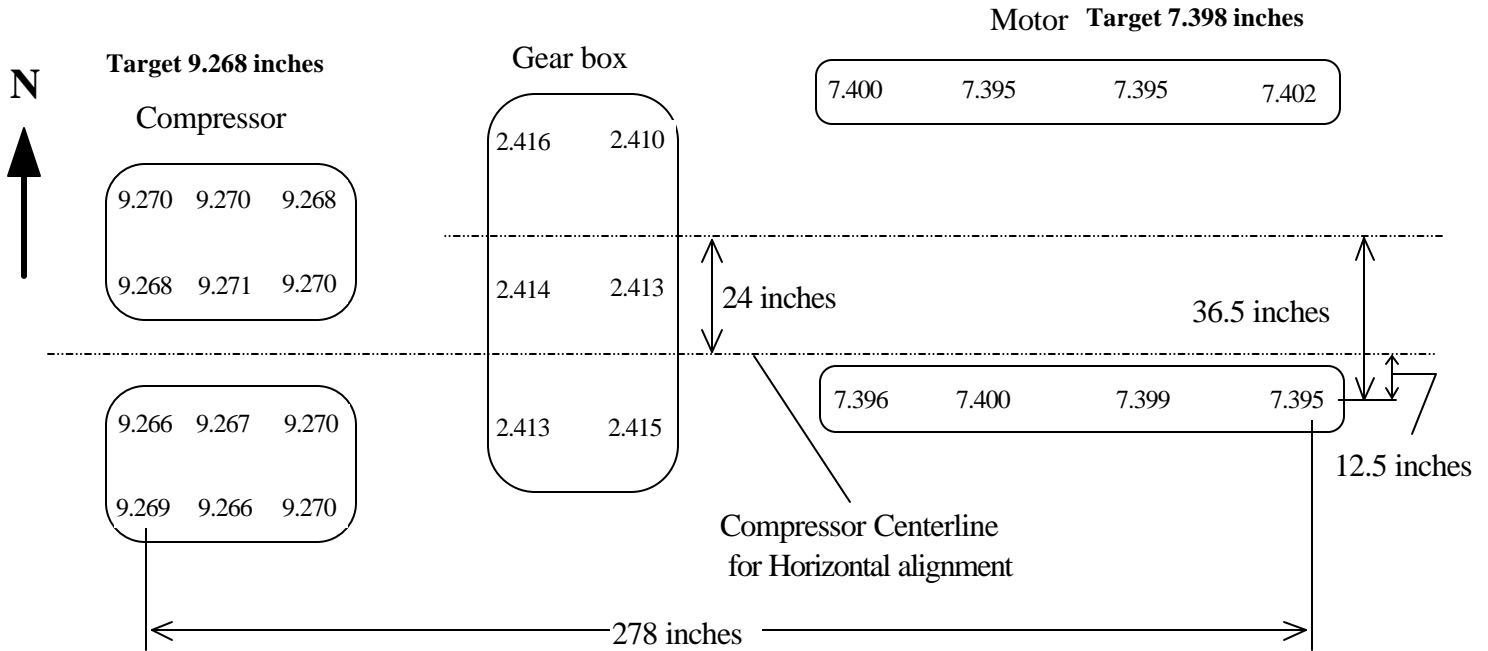
The relative horizontal centerlines of all the sole plates were within $\pm 1/32$ inch of the straight reference line established.

All Elevations are Relative and Referenced from the Gearbox Sole Plate

The average gearbox sole plate elevation for setting the compressor sole plates was 2.393 inches. The target elevation for the compressor sole plate with the 6.875 inches offset was 9.268 inches.

The average gearbox sole plate elevation for setting the motor sole plates was 2.938 inches. The target elevation for the motor sole plates with the 5.000 inches offset was 7.398 inches.

The elevations listed for the gearbox sole plate are the original elevations before the optical instrument was moved.



Relative Elevations and Locations

Recommendations

The setup and placement of the sole plates could have been less time consuming and easier to implement if the use of base plates and more typical methods of machinery attachment had been utilized in the design of the machinery foundations.

This might include attachment of base plates to the concrete pedestals and attaching the sole plates to the base plates. This would allow the machinery to be aligned and shimmed before final drilling and tapping of equipment hold down fasteners.

Appendix A (Instrumentation Used)

K&E Precision Split Bubble Level with Micrometer Head

K&E Precision Scales with Magnetic Bases

8 ft. Tripod

18 inch Starrett 4R Graduated Machinist Scales

Assorted Hand Tools

Desk Top PC for Reporting