PackView™ - Packed Column Maldistribution

One of the most common and cost effective methods of identifying liquid maldistribution and other problems affecting packed column performance is by performing a Tracerco Tru-Grid™ Scan.
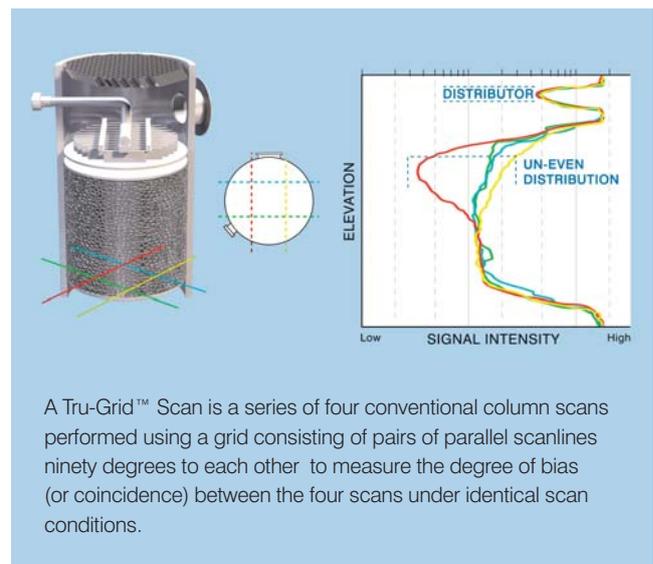
A Tru-Grid™ Scan is a series of four conventional column scans performed using a grid consisting of pairs of parallel scanlines ninety degrees to each other. With regard to liquid distribution through packed beds, the objective of a Tru-Grid™ Scan is to measure the degree of bias (or coincidence) between the four scans under identical scan conditions. If non-uniformity is detected between these scanlines this confirms bulk density differences that is usually attributed to an imbalance in liquid traffic.

Tracerco has developed new packed column technology, PackView™, which is an enhancement in Tru-Grid™ Scan detection capability and data presentation. An in-depth feature of PackView™ is the addition of a liquid retention scale to Tru-Grid™ Scan analysis. The density scale begins at the density of the dry or non-operating packing. The density scale to the left of the dry packing density is the calculated density of the liquid retained in the bed of packing. As with the normal gamma scan analysis, if the four scanlines have matching liquid retention densities then the implication is the liquid distribution is good. However, if there is a difference between the scanlines, the retention density gives a numerical comparison from which to gauge the extent or severity of any liquid maldistribution.

Project Field Test

A Tracerco customer requested a scan of their packed column with structured packing that had not been giving the required separation at design rates. Heavy ends were found in the side stream drawn from the collector/draw tray above Bed 2, indicating off-spec performance.

A Tru-Grid™ Scan was requested to verify that the beds and distributors were in place, and provide some explanation for the column's inadequate performance.

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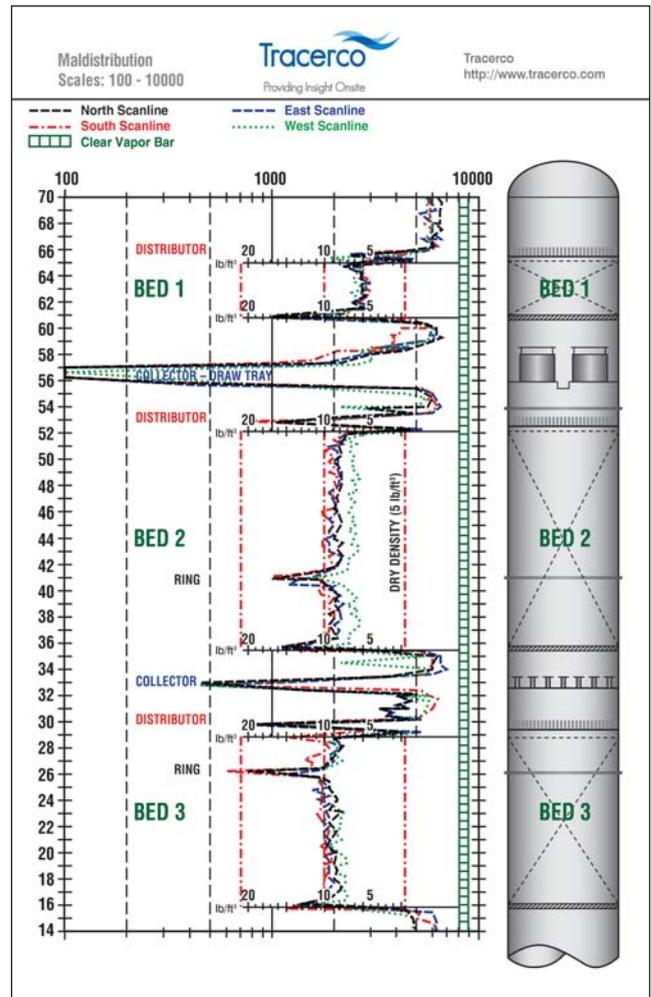
Project Analysis

The Tru-Grid™ Scan of the packed column indicated all distributors, collectors, and beds were found to be in place. The liquid distribution through Bed 1 was good with all four scanlines showing a liquid retention of 80Kg/m³-96Kg/m³. The liquid distribution through Bed 2 was poorer as the green (dot) scanline (112Kg/m³-128Kg/m³ on the liquid retention scale) indicated a liquid deficiency compared to the other scanlines (144Kg/m³- 160Kg/m³). The liquid distribution through Bed 3 seemed acceptable as all scanlines had between 128Kg/m³ and 160Kg/m³ of liquid retention.

The data results from Figure 1 scan plot suggested that non-uniform liquid distribution in Bed 2 was the reason for the poor column performance. The nature of the data indicated that the liquid distributor above this bed was likely to be the source of the problem.

Customer Conclusion

Soon after the scan, the customer shut down the column. Upon inspection, all internals were found to be in place. The distributor above Bed 2 was found to be out of level. In fact it was so far out of level (2.5cm) that the packing below the distributor had been discolored due to the lack of liquid contact. After leveling the distributor the column's performance improved dramatically.

Enabling you to make the right decision

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Process Diagnostics