

# Distillation Column - Tray Damage and Flooding

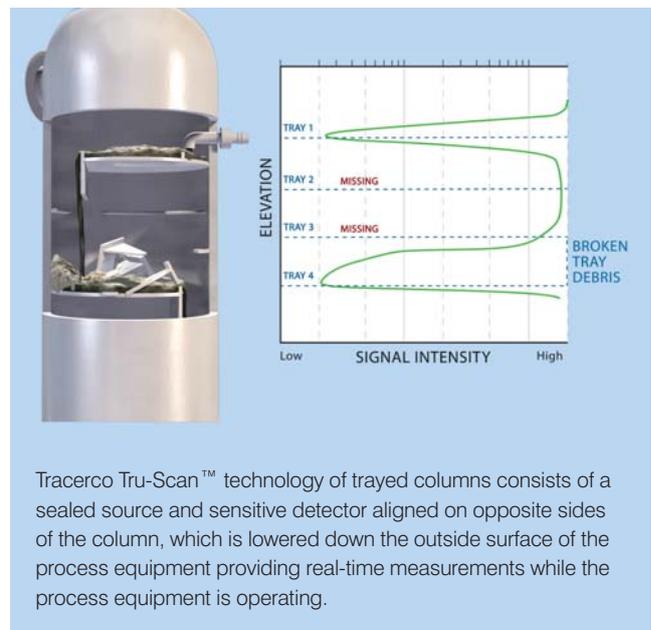
**Tracerco's Tru-Scan™ service provides reliable information on distillation column performance, while the column, is online and operating at normal, test, or upset conditions.**

The scan provides an "inside look" at the column's hydraulic process performance from the top tangent down to the base liquid level. The interpretation of a Tru-Scan™ can be used to diagnose virtually any operating malfunction that can be identified by an observable density difference. This includes most mechanical, process, or rate related problems - such as tray damage, foaming, weeping, and entrainment - to name a few.

Tru-Scan™ services have proven to be a cost effective means of reducing off-spec production and equipment downtime. In today's highly competitive refining, petrochemical, and chemical processing markets, more customers are using Tru-Scan™ information to eliminate plant bottlenecks and to optimise performance.

## Project Field Test

A large refinery had been experiencing unacceptable performance from their depropaniser column. Tru-Scan™ results of the column scan are shown in Figure 1.



Tracerco Tru-Scan™ technology of trayed columns consists of a sealed source and sensitive detector aligned on opposite sides of the column, which is lowered down the outside surface of the process equipment providing real-time measurements while the process equipment is operating.

Two scans were performed on the depropaniser with the first scan conducted at normal feed and reflux rates and is denoted by the black (solid) line.

After the results from the first scan were reviewed onsite plant management decided to greatly reduce feed and reflux rates in order to relieve the flooding and make Trays 11-29 visible. The second scan of the depropaniser is depicted by the orange (dashed) line.

## Project Analysis

### Summary of results from the first scan (black solid line):

Scan results from the first scan showed Trays 1-8 were operating with very minimal froth heights (ranging from 13cm ±3% to 20cm ±3% ) and were weeping severely. Liquid back-up flooding was found, originating at Tray 29 and extending upward to Tray 10. Tray 30 was found to be in place, operating with a froth height of 188cm ±4%. Because Trays 11-29 were inundated with liquid, it was not possible to verify their placement or evaluate their ability to maintain froth.

### Summary of results from the second scan (orange dashed line):

After the plant reduced the feed and reflux rates for the second scan no significant change was found on Trays 1-8. Trays 9-18 were found to be virtually dry and weeping severely and Trays 19-25 were found to be missing. There were odd and irregular data responses found for Trays 26-29 and Tray 30 remained intact.

## Customer Conclusion

Based upon Tru-Scan™ results, the following conclusions were derived:

- Trays 1 - 18 were partially damaged and unable to sustain normal froth heights.
- Debris from Trays 19 - 28 had collected on Tray 29, restricting liquid traffic and stacking liquid from that point upward.

The customer ordered replacement trays and had them ready for a shutdown. Upon entering the column, Trays 1 - 18 were found to have severe corrosion damage. Trays 19-28 had been blown out and were found on top of Tray 29. The scans enabled the customer to order trays, plan a shutdown, and avoid the additional costs of ordering replacement equipment on an emergency basis.

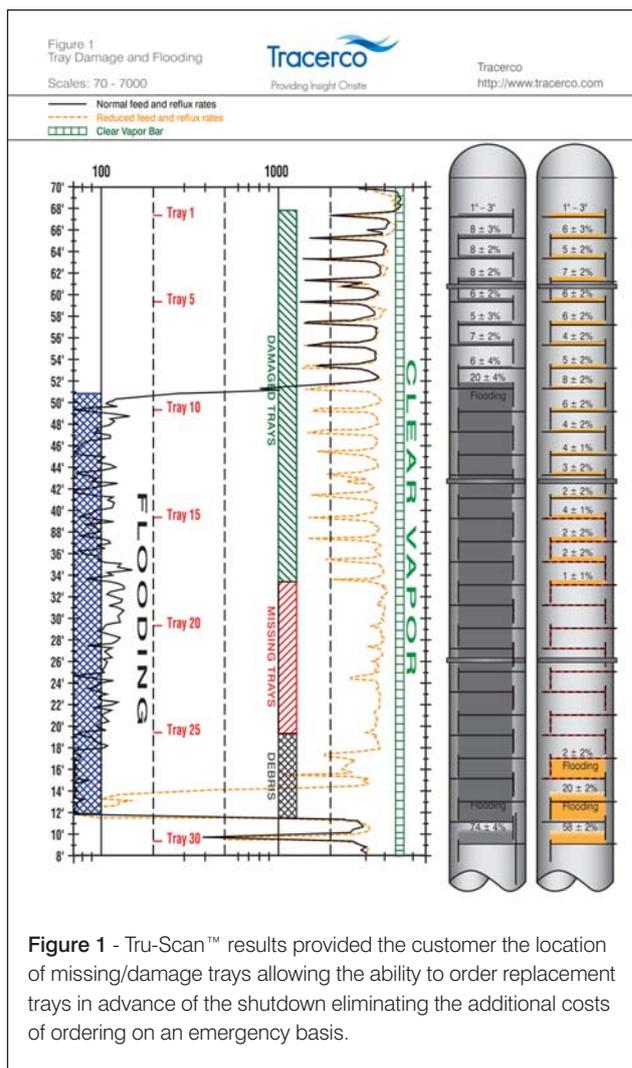


Figure 1 - Tru-Scan™ results provided the customer the location of missing/damage trays allowing the ability to order replacement trays in advance of the shutdown eliminating the additional costs of ordering on an emergency basis.

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