

# TRUFLUX

High Resolution Digital Tank Floor Plate Scanner



The TruFlux is a new concept in Magnetic Flux Leakage (MFL) tank floor plate inspection, incorporating a new level of user sophistication in its innovative design. The TruFlux has the benefits of advanced features and practicality.

As a fully self-propelled high-resolution digital scanner, the TruFlux is capable of producing highly accurate topographical images of 6-20mm storage tank floor plates.

Particular attention has been paid to the mechanical design, notably in its physical size, weighing in at just 55kg inclusive of its slip-in-slip-out lithium ion battery pack.

The TruFlux system is easy to use and highly practical. For ease of shipping the whole unit folds down easily for transportation and with its reduced physical size and lower weight, handling and set-up require little effort, making life easier for the operator in the field.

### Innovation

The TruFlux incorporates a damping system designed to alleviate the usual high forces required to break magnetic contact. The active damping system controls the scanner lift-off and placement in one easily controlled motion, greatly reducing any high levels of mechanical loading.

It is well documented that for this type of magnetic flux leakage technique, speed variations

### Key Features

- Efficient & Effective Mechanical Design.
- Superior Resolution (5.2mm x 1mm)
- Lightweight, 55kg (inc. battery)
- Easy to transport, shipping weight 80 kg
- Easy reporting via Laptop, USB.
- Semi-rugged laptop upgradeable to a fully rugged option.
- Unique damping system provides easy lift-off.
- High resolution optical encoder. Positional accuracy of  $\pm 1$ mm over a 20m scan track.
- Fast track-to-track scanning images.
- USB connectivity means the Truflux effectively works as a simple “plug and play” unit.
- Off-the-shelf battery technology.

whilst scanning cause adverse effects on data quality. TruFlux employs a proprietary **Speed Compensation Algorithm** to help remove spurious indications arising from this anomaly. In addition all scanning speeds are cross-correlated back to the calibration and kept within controlled margins.

Particular attention has been paid to data acquisition, data handling and communication protocols. The entire electronics package is housed within the fully ruggedized scan-head enclosure, powered only by the USB; effectively the TruFlux has become a simple plug-and-play device. This greatly improves site reliability, as complex electronics and connectivity are susceptible within harsh environments.

The Data Acquisition Software (DAQ) has been developed for both touch-screen and standard pc applications. With fast control function set-up allowing less operator inputs per scan, resulting in faster plate scan time. Auto-hierarchical directory construction eliminates possible overwrites or “non-save” issues.



Armoured cable connectivity

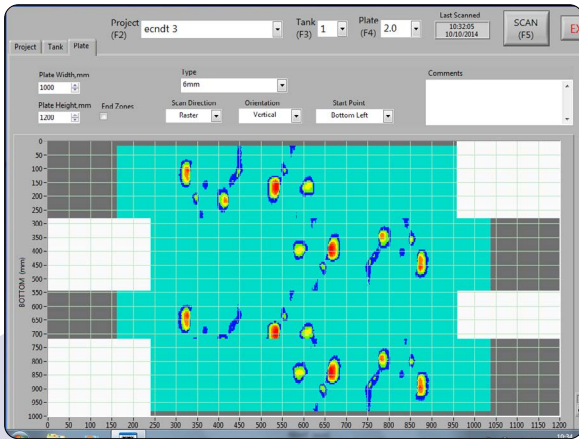


Fig 1: TruFlux Rasterscan

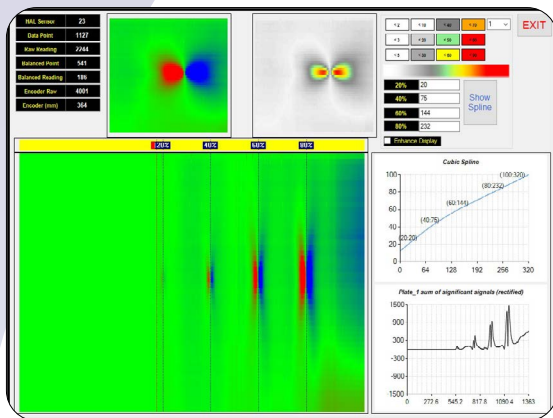


Fig 2: Calibration Set Up

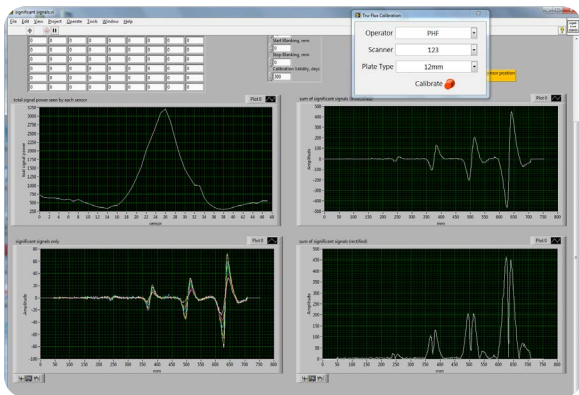


Fig 3: TruFlux 12mm Plate Calibration Signals

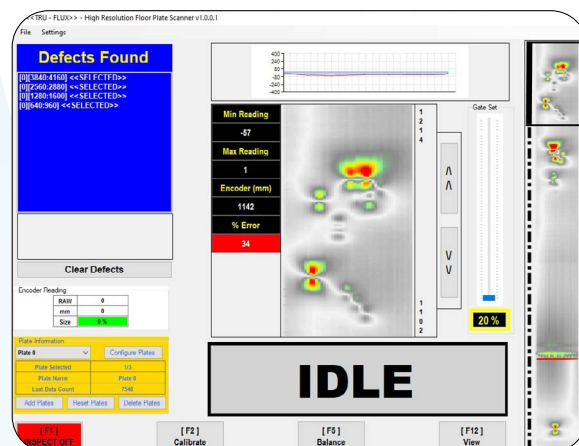


Fig 4: Scan Map, Stop on Defect data

Algorithms developed to filter flux leakage distortion, provide the operator and client a greater understanding of the visual data displays. Point-to-point data samples from 48 channels are stored in each track run and can be cross-correlated with subsequent inspections for predictive corrosion growth analysis.

### Digital Resolution

Readings from 48 hall effect sensors are captured and digitised every 1.0 mm of forward travel at a scanning speed of 500mm p/sec.

### Auto-Drawing, Scaling and File Handling.

The software produces a full-scale drawing of the tank floor, using auto numbering of plates and tracks including annular rings. Scanned plots of tracks are auto-positioned onto plates; as are the plates into the tank image.

All file and directory handling is produced automatically, resulting in significantly faster track-to-track scanning speed.

Unrivalled data image display reveals any material loss as a high-resolution corrosion map with additional controls for zooming, panning and saving images.

Threshold sensitivity can be adjusted to client requirements along with colour choice e.g. any indication over a set percentage loss can be set to a single indicative colour.

Once operator inputs have been selected an automatic plate scan strategy is generated. The operator has then only to follow the on-screen guidance, whilst also being able to choose and select end zone scanning.

A preliminary PDF report output, enables the inspector to leave a first draft report upon completion. This enables the client to be immediately reactive to possible issues.

### Overlay Feature

Past inspection results can be overlaid in both tank, plate and track format providing the engineer with a view and indications of corrosion growth areas and trends, assisting with predictive analysis.

### Battery Design Feature

The TruFlux uses Lithium-ion battery technology with push pull hot swappable capability. A fast recharge function and four batteries per unit provides 24hr utilisation.

TruFlux Specification	
Principle Of Operation	Magnetic Flux Leakage
Detection	48 Hall Effect sensors
Scan Width	300mm
Method of Propulsion	DC motor
Speed	500mm/s
Thickness Range	6-20mm
Test Through Coatings	Yes
Maximum Coating Thickness	6mm
Maximum Sensitivity	20%
Auto-Stop	No
Power Requirements	2x Lithium-Ion batteries
Transit Case	Meets IATA requirements for transporting magnetisable material.
Operating Weight	55kg
Stop on Defect	No
Real Time Analysis	Yes
Real Time Averaging	Yes
Real Time Digital Signal Processing	Yes
Freeze Screen Alarm	No
Linear Resolution	0.5mm
Speed Compensation Algorithm	Yes
Digital Data Storage	48 Channels x 0.5mm
Scan Length	Unlimited
Scan Plate End Zones	Yes
Adjustable Sensitivity Range	Yes
Laser Guide	Yes - optional
Fully dampened magnetic contact	Yes
Assisted Magnet Lift-Off	Yes. Minimal effort required to break magnet contact, resulting in considerably less operator fatigue.
Scan Length Alignment (whilst in magnetic contact)	Yes. The scan track can be fully aligned when the magnet is in contact with the plate, alleviating the need to break contact if track alignment was not achieved.

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