

CASE STUDY

Compact, Reliable Linear Measurement Encoder Solves Challenge for Mobile Machinery OEM

Background

New Tech Machinery (NTM) manufactures a variety of mobile metal forming machines for use at outdoor job sites, including machinery for producing roofing panels and seamless gutters.

The SSQ Multipro Roof Panel Machine is one of the best selling products for NTM. Compact and portable, it's versatile, easily transported and allows contractors, installers and fabricators to produce custom metal roofing panels in any length, with speed, precision and accuracy.

A coil of metal is fed through one end of the machine and receives one of 15 different profiles as it's drawn through. Once the desired length is achieved, the metal is automatically cut. To accomplish this, a rotary encoder provides feedback to the controller, allowing it to determine the length of material that has fed through. When the programmed length is achieved, the feed is halted and the shear mechanism is activated.



*New Tech Machinery's
SSQ Roof Panel Machine.*

The Problem

When designing the SSQ Roof Panel Machine, NTM needed an incremental encoder that would provide accurate linear measurement, while holding up well in the rigors of transport and the outdoor environment. Since the machine is portable, minimizing machine footprint and weight was also a priority, so a compact component was preferred. In addition, NTM determined that providing feedback directly from the metal surface would deliver optimum precision and accuracy. Thus, an encoder and measuring wheel were preferred. Finally, the measuring wheel would need to maintain constant contact with the metal while absorbing any slight variations or movement of material. A spring tension system would be specified as well.

As a critical component in the measurement and control system of the SSQ Roof Panel Machine, the encoder needed to operate reliably. Failure of the encoder could result in costly loss of material, lost work time, and possible damage to the machine. To accommodate the mobile outdoor operating



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Summary of encoder requirements for this application:

- Encoder with measuring wheel
- Spring-tension or other system to maintain constant wheel contact
- IP65 rating
- Shock and vibration tolerant
- Open collector output type
- M12 connector

environment, the encoder would need an IP65 seal rating to permit exposure to dust, debris and moisture. It would also need to tolerate shock and vibration. Finally, an output type compatible with the current control system and M12 connector were desirable features.

The Solution

After considering several possible feedback solutions and completing a thorough test and evaluation process,

NTM selected the Model TR1 Tru-Trac™, which was provided by their local EPC distributor [Technical Marketing and Manufacturing, Inc. \(TMMI\)](#) of Wheat Ridge, Colorado.

The TR1, with its compact footprint, integrated measuring wheel and spring loaded torsion arm made perfect sense for the application. Constant spring tension ensures that the measuring wheel stays in contact with the metal at all times, while the pivot arm accommodates any incidental movement of the panels. As an additional benefit, the TR1 is easily installed during assembly and, if necessary, it can be readily adjusted or removed during machine maintenance or repair.

Since NTM launched the SSQ Metal Forming Machine in 2010, the machines have been in operation in

Key features of the Model TR1 Tru-Trac™:

- Integrated incremental encoder, measuring wheel and spring-loaded torsion arm
- Operates in any orientation
- Compact, one-piece design is light and durable
- Fully configurable encoder with up to 10,000 CPR resolution
- Accommodates line speed up to 3000 feet per minute
- 6" or 200mm circumference wheel, with knurled aluminum or urethane surface
- Optional IP64 environmental seal
- Easily installed and adjusted



Model TR1 Tru-Trac™

The TR1 Tru-Trac™ is a versatile solution for tracking velocity, position, or distance over a wide variety of surfaces in almost any application. An integrated encoder and spring loaded measuring wheel assembly available in one, the TR1 is both easy-to-use and compact.

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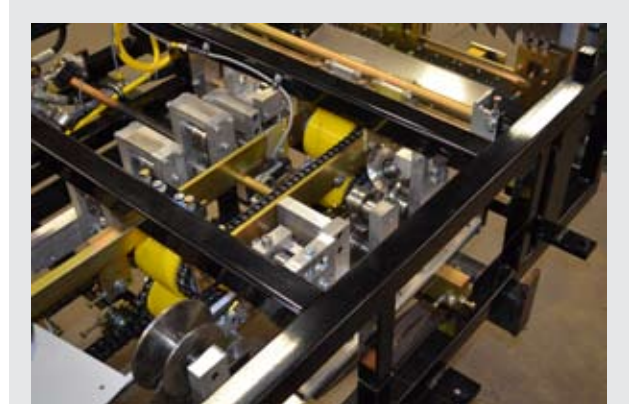
the US and dozens of countries around the world. As of this publication, NTM has had zero encoder failures.

The TR1 Tru-Trac™ has been so reliable in the SSQ Metal Forming Machine that NTM has used it for other projects as well. For example, recently NTM developed a simplified roofing machine that retails for a fraction of the cost of the SSQ. As part of the design process many components, including encoders, were reviewed for cost reduction alternatives. Various other encoder solutions were considered, but NTM opted to apply the Model TR1 Tru-Trac™ on the new machine.

For [New Tech Machinery](#), no other encoder could measure up to the TR1 Tru-Trac™.

Additional Resources

To see the SSQ Roof Panel Machine in action, watch the video [here](#). To see a video about the TR1 Tru-Trac™ click [here](#).



The TR1 Tru-Trac™ as installed. The spring loaded torsion arm provides constant contact between the measuring wheel and roofing material.