

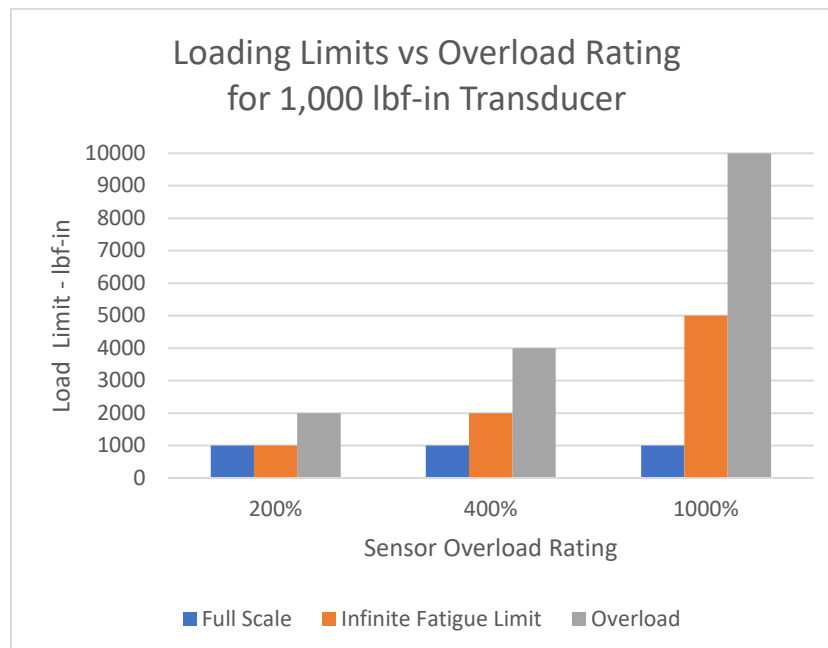


## Overload/Overrange What's the Difference?

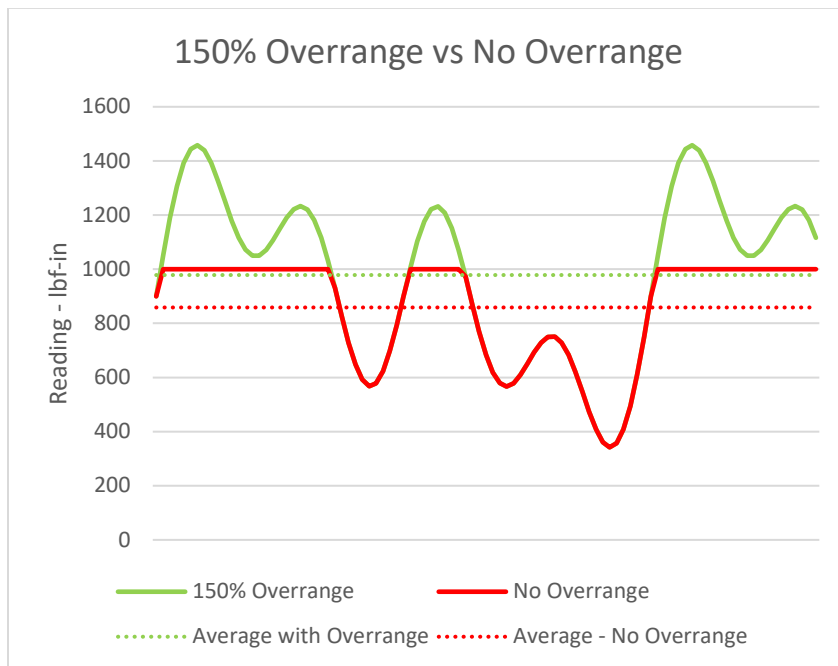
Two easily overlooked, yet extremely critical parameters when evaluating and specifying torque transducers are – Mechanical **Overload** Rating and Electrical **Overrange**. Each is important, but often confused and misunderstood.

**Overload** – represents a mechanical safety factor for the sensor element. Normally expressed as a percentage of the sensor full scale rating, it is the maximum load limit of the sensor before yield or physical deformation. S Himmelstein and Company products are available in a variety of overload ratings – typically either 200%, 400% or even 1,000%. The sensors are designed for infinite fatigue life for operation at or below one-half of its' mechanical overload rating. The overload region – from one-half the overload rating up to the full overload rating – should be reserved as safety factor for occasional unexpected events. Operation in the overload region will not immediately damage the unit, but repeated operation or frequent cycles into the overload region will decay the fatigue life to a finite value and may eventually lead to a fatigue failure. Operation above the full overload rating may result in physical deformation or yielding of the sensor element or strain gages. This loading will not cause a catastrophic failure but will be evidenced by a significant permanent zero offset.

By way of example, a 1,000 lbf-in (113 Nm) sensor with a 400% overload rating, will have a maximum overload of 4,000 lbf-in (452 Nm). The infinite fatigue life loading limit would be one-half its' overload rating, or 2,000 lbf-in (226 Nm). Operation between 2,000 lbf-in (226 Nm) and 4,000 lbf-in (452 Nm) will not damage the unit but will start to decay the fatigue life. Loading above 4,000 lbf-in may result in a permanent zero offset.



**Overrange** – is a parameter that relates to the sensors’ electrical output signal. Also expressed as a percentage of the sensor full scale rating, it represents how far the output voltage will extend beyond full scale. The majority of S. Himmelstein and Company sensors now incorporate integrated signal conditioning electronics for processing of the sensor strain gage signal. The analog outputs are normally configured such that 10 Vdc will be equal to the sensor full scale rating. Unlike most manufacturers, the outputs of Himmelstein sensors are not clipped at full scale or 10 Vdc, they will typically have an overrange of 150% allowing the output signal to extend to 15 Vdc. This feature will avoid clipping of oscillatory signal components occurring at or near full scale that are inevitable in rotating applications. The result will be a more accurate representation of the average value. S. Himmelstein and Company has published a technical document with a more detailed discussion – Application Note 20805B.



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