



PROJECT PROFILE

FATIGUE ANALYSIS OF SENSING SPRING

CLIENT REQUIREMENT

This client develops highly sophisticated weigh scales, instrumentation and systems that are shipped around the world. Prior to the incorporation of Palladium Product Development & Design Inc., the company was in the process of changing suppliers for the key sensing spring in their impact weighing units. The sensing spring is a key component providing functionality and accuracy in the impact weighers. Key personnel with Palladium today were retained at that time to provide an analysis to estimate the high cycle fatigue life of the sensing spring under loading conditions that represent those expected in commercial use. To date at that time, there had been no known field failures of the sensing spring. Of primary interest was determining what safety margin existed in the existing design, from their previous supplier. This information would assist in determining the risk of changing suppliers. FEA analysis, reporting and recommendations were provided by the outsourced team.

The following tasks were performed to successful project completion:

- Collection of part manufacturing drawings and accurate material data including fatigue strength.
- Collaboration with suppliers to obtain truly representative material and dimensional data for the as manufactured sensing spring.
- Modelling of an accurate as manufactured 3D CAD sensing spring.
- Assessment of accurate part constraints and pre-loading as they exist in the final assembled system.
- Assessment of cyclic loading conditions while part is in use in the assembled system.
- Calculation of static and fatigue loading condition stresses.
- Formal report to the client presenting the results of analysis, with recommendations.

PROJECT HIGHLIGHTS

The analysis results gave the client confidence to:

- Ensure purchasers of the weighing system of infinite sensing spring life.
- Mitigate the risks associated with changing sensing spring suppliers.



ENGINEERING ANALYSIS SERVICES

Palladium Product Development & Design provides engineering analysis for many products, industries and companies such as the case history described above. The same personnel involved with the spring analysis described above are still active with Palladium and providing services to past clients they have served, as well as taking on new clients with product improvement programs. Design modifications related to manufacturing/machine design, material characteristics and selection and inclusion of client/user feedback are routinely implemented as a result of these analyses and design engineering services.