Strainlabs

Book of values

STRAINLABS SYSTEM, VERSION 1.2



Introduction

Strainlabs AB is the developer, manufacturer and supplier of a bolted joint monitoring system called Strainlabs System.

Bolted joints are commonly used in mechanical and structural applications to join components together. However, bolted joints also pose several major problems if not properly designed, installed, and maintained.

The primary purpose of Strainlabs system is to monitor bolted joints in:

- short term to ensure correct installation.
- long term to ensure proper maintenance and avoid failure.
- to collect data to be used for bolted joint design and dimensioning.

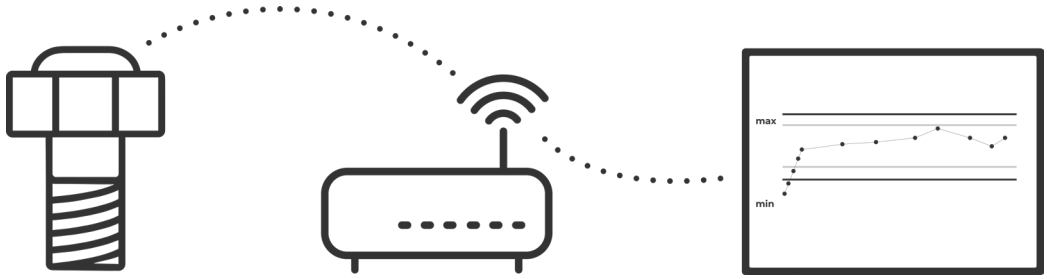
Strainlabs System - Book of Values intends to describe the financial and operational values of monitoring bolted joints from an OEM and end-user perspective.



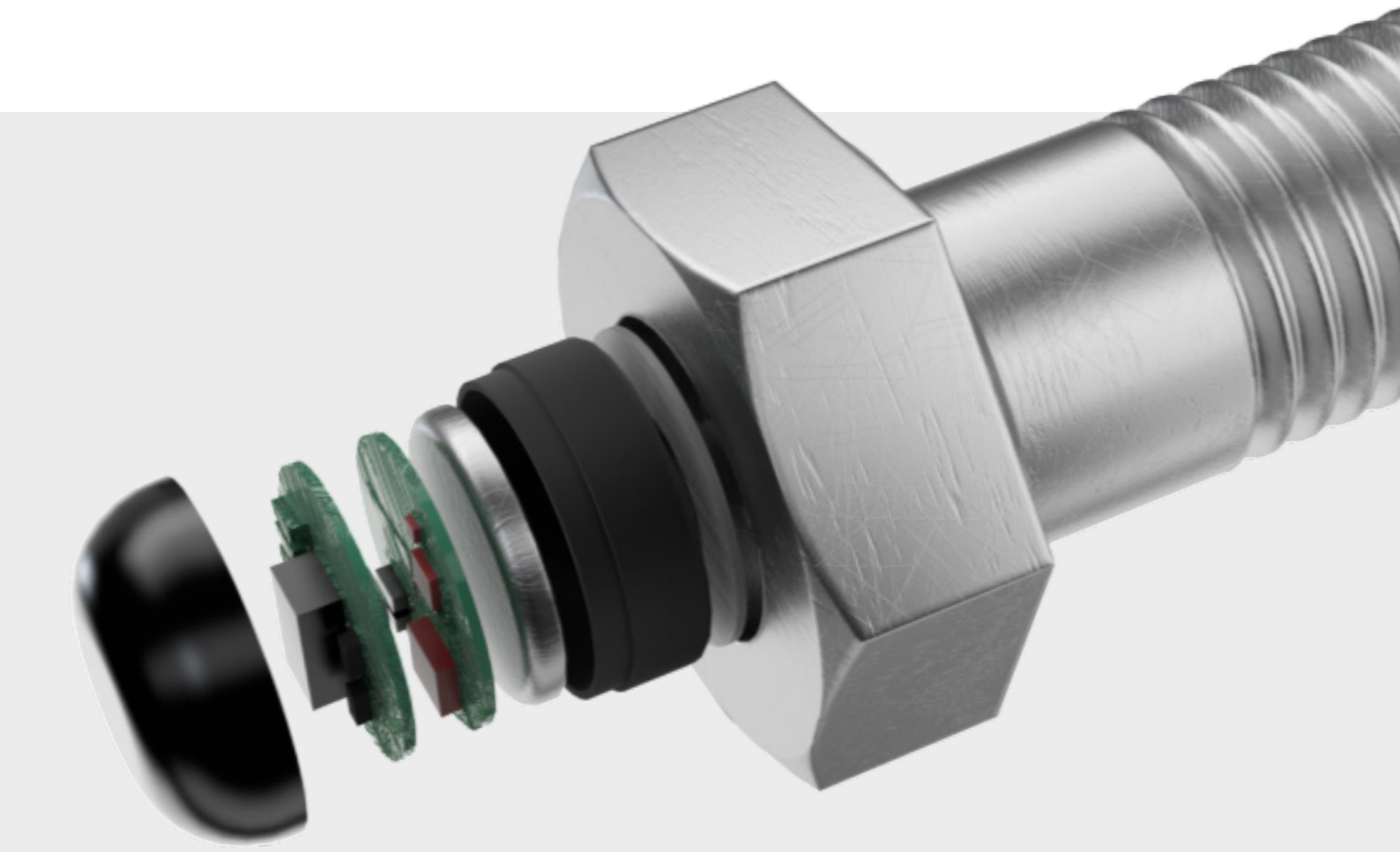
Strainlabs System

Strainlabs System is comprised of 3 elements:

1. A sensor equipped bolt - Strainlabs Bolt.
2. A router - Strainlabs Router.
3. An analysis software - Strainlabs Analytics.



Strainlabs Bolts collect data through an automatic process and wirelessly transmits it to a Strainlabs Router which uploads the same data to Strainlabs Analytics, see schematic above.



Problems with bolts

A bolt can be associated with many problems, which a monitoring system can detect and provide notifications for.



Business related consequences of bolt failure

If a problem occurs with a bolt and it fails, it does not only affect the bolt, but also the application which components it joins as well as the value chain which the application is a part of. Therefore, it is of high financial and operational value to any OEM and End-User organization to be notified about an upcoming failure and being able to prevent it from ever occurring.

Common business-related consequences of bolt failure are:

Production and operations disruption
Such as down time, delivery delays and increased costs.

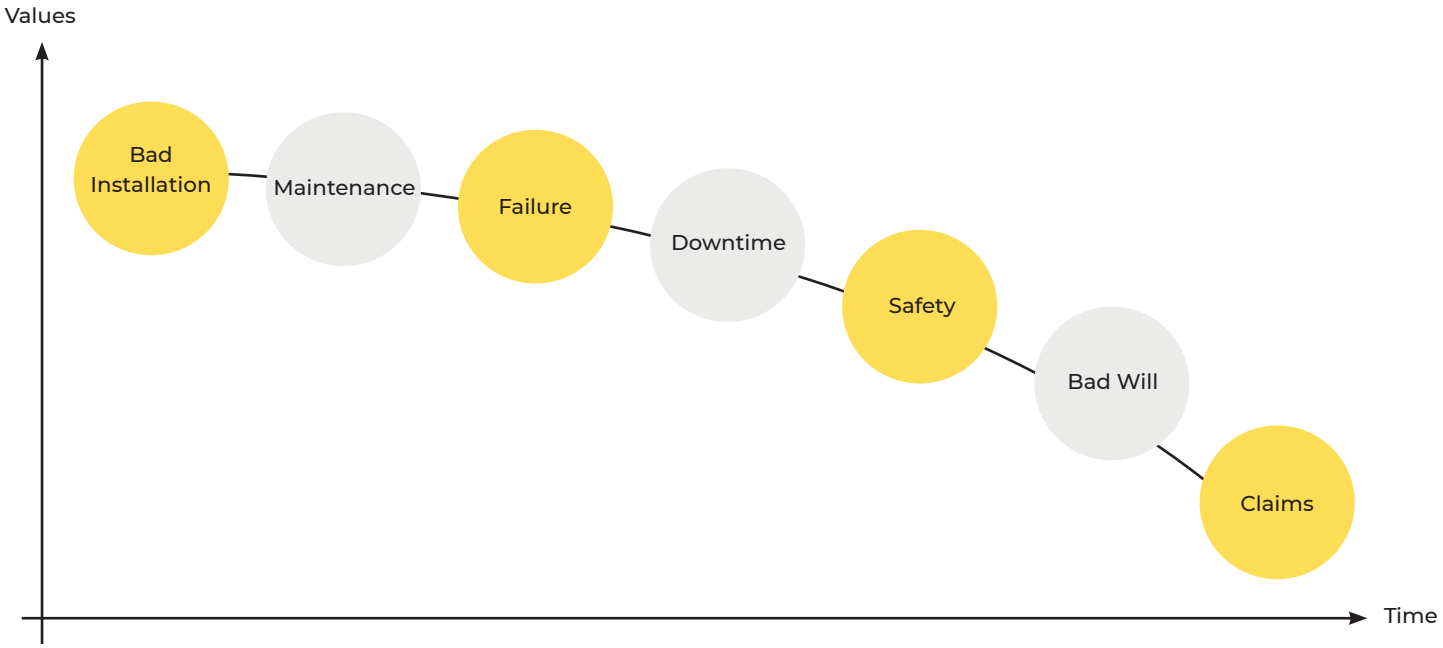
Financial losses
Such as revenue loss due to lost production, repair and replacement costs and machinery or parts thereof, fines for non-compliance with agreements.

Reputation damage
Such as loss of credibility.

Safety risks
Such as danger to employees and equipment users as well as environmental impact.

Legal issues
Such as disruption of contractual obligations and regulatory compliance.

Loss of competitive advantage
Such as competing with subpar products that fail.



Value for OEM

Bolt monitoring can provide significant financial values for an OEM both through sales (subscription) of data and by analyzing customer usage of an application.

Examples of considerations for OEMs looking to sell data are:

Sustainable revenue generation
Selling data, such as raw data or analytical models, can be a new revenue stream beyond just selling physical products.

Customer engagements
Data can provide insights into how customers are using their applications. OEMs can use this to create additional offerings.

Market insights
Aggregated data from multiple applications can be used to identify trends and market opportunities.

Bolt monitoring also provide operational values for an OEM. Example of such values are:

Product improvements
The analysis of bolt data can identify application issues, predict maintenance needs, and be used to develop better applications.

Competitive advantage
Data can be used to identify future need and sellable features.

Innovation
Improvements of products, processes and quality.

Case example



Transportation & Infrastructure

Roller coaster manufacturer

Roller coasters and amusement park rides have an extensive use of bolts which must be regularly inspected and documented for customer safety. The inspection process provides no reliable data, safety is still a concern, is expensive, time-consuming and risky for employees. By using Strainlabs System the OEM can offer the End-User the service of remote bolt inspection and issue notifications.

The values are

New revenue for the OEM, improved processes, higher safety, reduced cost and work for the End-User, higher competitiveness, innovation and data-driven decision making.

Value for End-User

The operational value of bolt monitoring is high for an End-User because it minimizes disruptions in business operational processes. Operations is the continuously improving process of producing goods or services which delivers value to the customer and revenue to the End-User in a sustainable way.

Examples of values for an End-User are:

Efficiency

Can be increased when manual inspection of bolted applications is automated. Time is saved and documentation is automatically processed.

Cost reduction

Automated inspections cut unnecessary expenses for tools, labor, down-time and value for lost production.

Safety

Failed bolts is one of the most common root causes for breakdown, which often leads to dangerous or environmentally hazardous scenarios.

Employee

Up-to-date, aware and well-trained employees are motivated, productive and contribute to operational success.

Sustainability

Every performed task leaves an environmental footprint. Automatic bolt inspection reduces the number of tasks performed and increase positive public perception.

Data utilization

Bolt monitoring can enable data-driven decision making, predictive maintenance and process optimization.

Case example



Process & Manufacturing

Paper mill / Rollers

The bolts retaining the rollers are difficult to tighten and sufficient preload is not always achieved. Operation of the paper mill is therefore critical as the rollers may fail with risk of injury to employees, damage to production equipment, down-time and loss of revenue due to lost production. By using Strainlabs System the end-user can ensure sufficient preload during tightening and operation. Strainlabs Systems notifies in case preload deviates and the bolts can be simply adjusted.

The values are

Averted failure, no risk of injury, no damage to equipment, minimized down-time, minimized loss of revenue and minimum disturbance to operations.

Conclusions

BOOK OF VALUES

The conclusion is that the values gained by bolt monitoring with Strainlabs System can be used to:

- Ensure the integrity of a bolted joint.
- Reduce disturbance to operation.
- Grow sustainable business.
- Increase safety.
- Increase the level of innovation and positive perception of a company.
- Introducing and future-proofing digital business models.

