

## Wearable Sensor Technology and Data Analytics to Identify and Prioritize Ergonomic Risks in Baking Operations

### What's the Risk?

Wonderbrands is a leading producer of fresh baked goods, and the production of bread and bakery goods exposes workers to a variety of ergonomic risks stemming from ingredient handling, production tasks, workstation setup and the natural variability in how work is performed:

- **Heavy lifting:** Workers frequently lift and transport heavy ingredient containers, creating elevated forces on the back, shoulders and upper extremities
- **Repetitive motions:** High frequency motions such as stirring, mixing, shaping, transferring and packaging introduce repetitive stress to the wrists, elbows, shoulders and trunk
- **Awkward postures:** Many tasks require reaching into deep vats, leaning across wide equipment surfaces, bending forward at tables or lifting tools from awkward positions
- **Inadequate workstation design limitations:** Fixed or nonadjustable workstations often fail to accommodate differences in worker height and reach, increasing strain and forcing workers to adopt compensatory postures that heighten MSD risk
- **Work as imagined vs. work as performed:** When workers adapt or deviate from written procedures to meet real production demands, those adaptations can introduce unseen ergonomic risks and efficiency losses

At the Wonderbrands bread and bakery facility in Langley, British Columbia, the Health and Safety team, guided by [Human and Organizational Performance \(HOP\)](#) principles, focuses on understanding work as it is truly done. Through this lens, the team recognized that its in house capabilities were limited – both for conducting systematic ergonomic risk assessments at scale and for understanding the actual risks associated with tasks as performed in the workplace.

Project Aims

To address this limitation, Wonderbrands partnered with LifeBooster to deploy wearable sensors and leverage data analytics with the following aims:

- Reduce manual data collection time by establishing in-house capability to perform digital ergonomic risk assessments at scale using wearable sensors
- Develop a comprehensive risk baseline by quantifying and visualizing MSD risk exposures across all major production areas
- Build awareness and understanding of risk interpretation and continuous improvement among the site team through collaborative review sessions and ergonomic learning team workshops

Description of Project Activities and Implementation

The project was conducted at the Langley bread and bakery facility from July 2024 to January 2025 with the goal of using wearable sensor technology to better understand real-world ergonomic risk and to build sustainable internal assessment capability. The project followed a structured sequence: onboarding and training, full shift baseline data collection, preliminary risk analysis, and preparation for ergonomic learning team engagement.

Onboarding, Training and Capacity Building

The initiative began with an onsite kickoff and training session, during which LifeBooster trained Wonderbrands site leads and support staff in use of the wearable sensors, assessment procedures and data interpretation. Training followed a train-the-trainer approach to build local capacity, enabling the Langley site team to independently execute assessments.

Baseline Data Collection Across Eight Job Categories

Following training and deployment of the sensors, the Wonderbrands Langley team conducted an extensive data collection effort, capturing over 829 hours of motion data across 112 assessments and generating a robust, representative ergonomic exposure baseline. These assessments spanned eight primary job categories: bread line, roll line, bread packaging, roll packaging, scaling, shipping, receiving and sanitation.

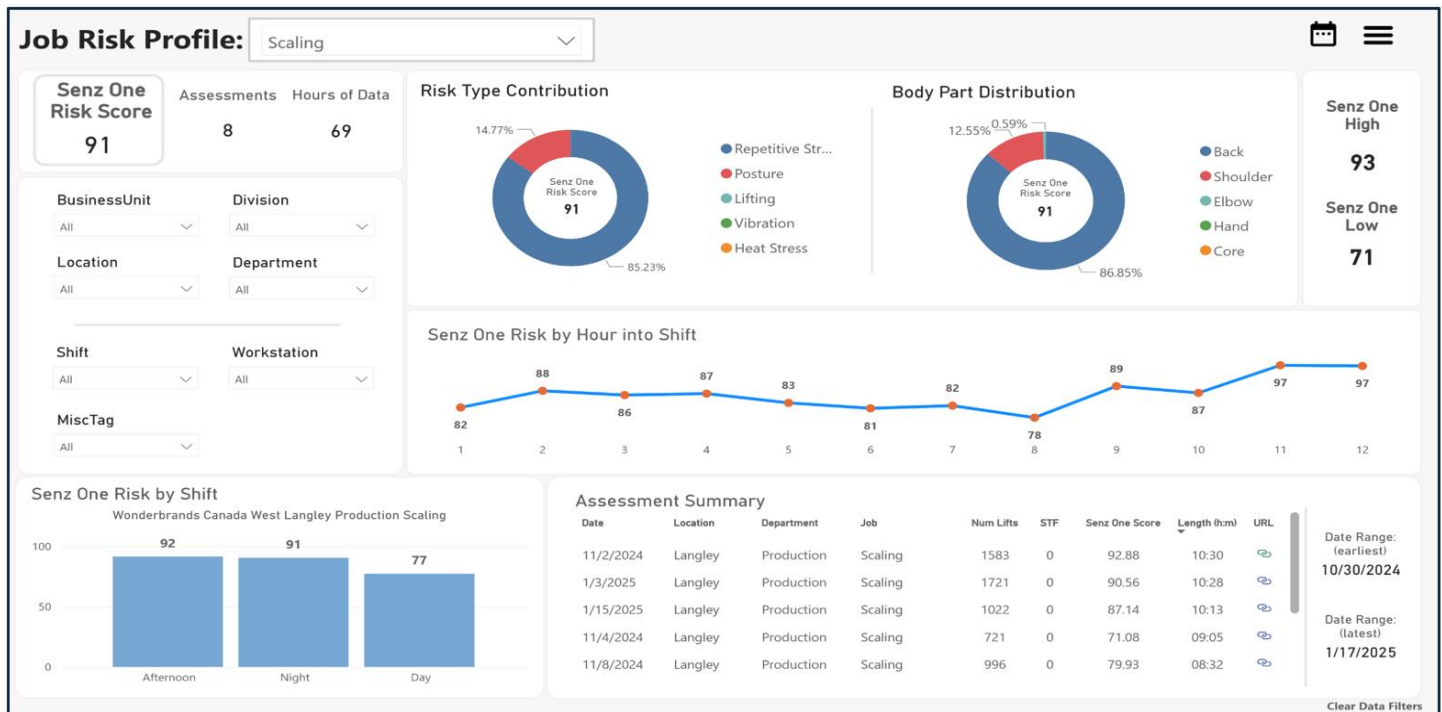
Table 1. Summary of baseline data collection by job group

| Department | Job             | Target Number of Assessments | Completed Assessments |
|------------|-----------------|------------------------------|-----------------------|
| Production | Bread Line      | 15                           | 15                    |
| Production | Roll Line       | 15                           | 15                    |
| Production | Bread Packaging | 15                           | 15                    |
| Production | Roll Packaging  | 15                           | 15                    |
| Production | Scaling         | 10                           | 10                    |
| Shipping   | Shipper         | 20                           | 22                    |
| Receiving  | Receiver        | 10                           | 10                    |
| Sanitation | Sanitor         | 10                           | 10                    |
|            |                 | 110                          | 112                   |

Analysis of Exposure Patterns and Risk Factors

The resulting dataset was processed and analyzed to identify meaningful risk patterns. Significant exposure variability emerged across job types, shifts and body regions. Early analyses also suggested higher exposures during certain shifts, likely related to task demands and production volume.

Figure 1. Example LifeBooster data analytics for scaling job role



## Project Challenges

Throughout the grant period, the Health and Safety team experienced significant staff turnover, including the departure of several key site leads involved in project coordination and data collection. These transitions required reassigning duties, onboarding new personnel and rebuilding project momentum, which contributed to delays in later phases of work. To maintain continuity during these changes, the LifeBooster team proactively onboarded and trained each new site lead and offered remote coaching, ensuring they were fully briefed on project objectives, data collection procedures and progress to date. This consistent support helped stabilize project operations and enabled the site to complete all baseline assessments and achieve the key data analysis deliverables despite limited and shifting resources.

While the project achieved its data-gathering and analysis goals, the next phase – conducting ergonomic learning team sessions to develop risk controls – has not yet moved forward due to ongoing team transitions and limited resources at the site.

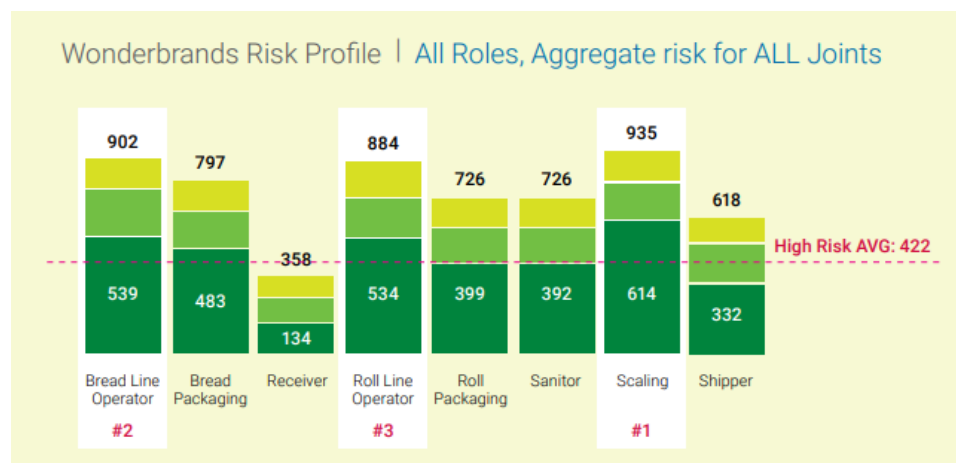
## Project Accomplishments and Lessons Learned

Despite challenges, the project delivered several meaningful and measurable achievements that advance the site's ergonomic understanding and readiness for long-term MSD prevention.

- Efficient completion of a comprehensive, baseline ergonomic assessment:** The team captured 112 assessments via wearable sensors across eight production job groups, creating a statistically robust risk baseline. The use of wearable sensors achieved a 95% reduction in data collection time compared to traditional observational methods, collecting over 800 hours of objective motion data in just four hours of onsite time.

- **Insight into work as performed:** The wearable-based approach provided visibility into how tasks are actually executed under production conditions, including operational constraints and worker adaptations.
- **Clear identification of highest risk roles and body regions:** Findings from the baseline assessments indicated variability in risk by job role, body part and shift:
  - **Exposure variability by job:** Bread line and roll line operators, along with those in scaling job roles, exhibited the highest total risk exposure scores (Figure 2), driven primarily by repetitive upper-body movements and sustained trunk flexion. With these roles identified as highest risk, efforts can be directed there as a starting point.
  - **Body region risk profiles:** The back and shoulders were identified as the top contributors to overall risk, particularly in manual handling and packaging activities.
  - **Shift-based differences:** Early data suggested higher exposure during day and afternoon shifts for certain roles (e.g., bread packaging and scaling), potentially linked to production volume and task rotation patterns.

**Figure 2. Relative risk exposure by job type**



- **Development of local technical capability:** LifeBooster's training and ongoing coaching, along with the train-the-trainer approach, increased internal expertise among site leads in digital risk assessment methods and data interpretation and improved in house ergonomic assessment capability.
- **Dissemination of findings to health and safety leadership:** LifeBooster presented the project's insights to site leadership at the Wonderbrands Langley facility, and the findings remain available to guide future potential ergonomic learning team sessions and targeted control implementation.

The project revealed several key lessons for future ergonomics efforts. The use of wearable sensor technology proved highly valuable, enabling efficient, representative and scalable ergonomic assessments far beyond what traditional methods can provide. The resulting comprehensive baseline dataset remains a lasting resource that leaders can leverage when ready. Because the sensors captured how work is performed under real production conditions, the findings aligned closely with Wonderbrands HOP principles. Pairing these data driven insights with structured learning team discussions can further deepen understanding of real work practices and strengthen shared ownership of safety outcomes. Although ergonomic learning teams were not

created during the grant cycle, the groundwork for them was established, including session design, facilitation guidelines and proposed discussion structure, positioning the site to move forward when conditions allow.

Health and Safety team turnover created gaps in ownership, slowed momentum and demonstrated that relying on a single team limits visibility and continuity. The project underscored that initiatives of this scope require cross functional engagement beyond health and safety teams and should embed stakeholders from operations, HR, finance, and other departments to strengthen ownership, resource availability and long term sustainability. For scaling, involving multiple teams at every stage (planning, execution and review) helps safeguard against turnover, creates organizational champions and positions ergonomic initiatives as enterprise efforts rather than department led projects.



LifeBooster is a workplace safety technology company focused on helping organizations prevent injuries through wearable sensor technology and advanced risk analytics. Its platform combines multiple wearable sensors with data-driven software to assess ergonomic risks, heat stress, and hand-arm vibration exposures across a wide range of work environments. By providing scalable, objective risk assessments and easy-to-understand risk scores, LifeBooster enables organizations to proactively identify hazards, prioritize interventions, and implement effective injury prevention strategies across their operations.

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