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Sompo Japan Insurance Inc.

Sompo Risk Management Inc.

NOK Corporation

Littlesoftware Inc.

Toyota L&F Kanagawa Co., Ltd.

# Development of Forklift Accident Prevention Program Utilizing Biometric Data

Sompo Japan Insurance Inc. (President, Representative Director and CEO: Koji Ishikawa; hereinafter referred to as "Sompo Japan"), Sompo Risk Management Inc. (Representative Director, President: Takahisa Nakamura; hereinafter referred to as "Sompo Risk"), NOK Corporation (NOK Corporation (Head Office: Shibadaimon, Minato-ku, Tokyo; Representative Director, Group Chief Executive Officer: Masao Tsuru; hereinafter referred to as "NOK"), Littlesoftware Inc. (Representative Director: Tatsuo Kawahara; hereinafter referred to as "LSW"), and Toyota L&F Kanagawa Co., Ltd. (Representative Director, President: Yoshimasa Sakata; hereinafter referred to as "Toyota L&F Kanagawa") have jointly conducted a proof-of-concept trial of an accident prevention program utilizing brainwave data, targeting companies that operate forklifts. The trial demonstrated that the data can yield meaningful insights into individual operator characteristics, including physical and mental readiness, thereby contributing to the reduction of forklift accidents. The five companies plan to launch this program as a commercial service.

## 1. Background and Purpose of the Proof-of-Concept Trial

Forklifts are indispensable cargo-handling equipment at a wide range of worksites, including distribution warehouses and factories, yet their operation carries an inherent risk of accidents. Approximately 2,000 forklift-related workplace accidents* occur annually across Japan, making improved safety a critical challenge for the country's forklift industry.

To date, safety measures have focused primarily on strict rule compliance and physical improvements to hazardous areas. However, the majority of accidents are caused by human error, and conventional measures alone have their limits. In response, the following five companies, each bringing specialist knowledge and expertise, collaborated to pursue a new approach: diagnosing the behavioral patterns (including routines) and cognitive characteristics of individual operators during operation using brainwave data, with the aim of achieving further reductions in property damage accidents and

workplace injuries.

Sompo Japan: Planning and design of the program

Sompo Risk: Provision of expertise cultivated over many years in accident prevention programs for forklift operators

NOK: Development of a proprietary rubber material that is easy to wear and capable of measuring faint brainwave signals from the scalp and forehead with high precision, and provision of a brainwave measuring device incorporating this material

LSW: Analysis of brainwave data to support optimized staffing and team formation

Toyota L&F Kanagawa: Contribution of expertise as a forklift dealer with deep roots in the local community

*Source: Japan Industrial Vehicles Association, "Occurrence of Workplace Accidents Caused by Forklifts" (original source: Ministry of Health, Labour and Welfare, "Industrial Accident Statistics")

**2. Overview of the Accident Prevention Program**

**(1) Program Description**

Under this program, biometric data, including brainwave readings, of operators during forklift operation are measured and analyzed using a dedicated helmet-type device and related equipment.
This enables the objective visualization in as little as 10 to 20 minutes of factors such as sustained concentration, attentiveness, moments of stress, and spatial awareness. These are aspects that previously relied heavily on supervisors' experience and intuition.
By capturing the characteristics of individual working styles through data, the program enables targeted training and support tailored to each operator, as well as appropriate team-based staffing arrangements. This scientific approach, distinct from conventional safety management, aims to reduce accident risk.
(Note: This device is not a medical device intended for the diagnosis, treatment, or prevention of disease.)

**(2) Service Options**

This program offers the following two services:
① Next-Generation Forklift Safety Training Service
Biometric data is collected during company-organized safe driving training sessions and similar events. Brainwave analysis is used to identify each operator's strengths and areas for improvement, as well as their working style. The program then proposes team compositions that consider compatibility among operators. It also checks the timing and habits of safety confirmations, supporting evidence-based guidance and development that operators can understand and accept.

② Live-Operation Forklift Safety Analysis Service

Biometric data are collected during routine daily operations. By identifying the specific points at which operators experience stress or perceive danger and linking these to their physical location in the workplace, the program pinpoints not only individual skill levels but also location-specific risks, supporting the creation of a safer and more comfortable working environment.

**(3) Provision of Reports and Video Content**

Through these services, the following reports and video content will be provided to strengthen companies' safety management frameworks:

① Individual Reports

Based on the collected data, signs of declining concentration and potential hazard points (near-miss points) are reported in concrete figures and images. Feedback on physically relevant considerations inferred from the data is also provided, contributing to the prevention of workplace accidents from multiple perspectives.

② Corporate Reports

Overall safety trends across the workplace, including strengths and potential risks or areas of concern, are quantitatively visualized. Each operator's characteristics are classified into one of six types and presented in a consolidated overview. Combined with compatibility assessments, this supports staffing arrangements that reduce accident risk and team-building initiatives that enhance workplace safety.

**3. Future Development**

Data obtained through this program will be aggregated and analyzed, with the long-term aim of developing predictive models for forklift accident detection and building more precise risk assessment algorithms. The companies also intend to explore extending the application of this technology to a range of vehicles and heavy machinery beyond forklifts, as well as to workers on manufacturing lines, thereby reducing human error and enhancing safety and peace of mind across all industries and sectors.