

Title	建設業の安全ナレッジマネジメント 情報通信工事部門におけるアクションリサーチ
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論文の内容の要旨

The total number of accidents at work in all industries has been on a decreasing trend since 1969. Still, even now, 1,030 persons are killed annually, and among them, the number of deaths in the construction industry is 342, representing 33% of the total. Furthermore, the breakdown of deaths by age shows those who were 50 or older occupy 48.0% of the dead, and those in the construction industry represent a high proportion of them. Their percentage tends to be higher than percentages of those in other industries.

This study is an action research conducted in the Information and Telcommunication Engineering Department of Company Sumitomo Denset co., Ltd., which is classified into the construction industry. It is intended to contribute to the solution of practical problems pertaining to safety activities by clarifying the processes of creating, sharing, and using safety knowledge in safety activities in the construction industry. It is important for the creation of safety knowledge to make explicit the formal knowledge of an organization and experiential knowledge of individuals and to systematize such knowledge to let it be shared and used by an organization. The major research question (MRQ) of this study is set as, "How was safety knowledge in the information and telcommunication engineering department created, shared, and used?" Processes of creating, sharing, and using safety knowledge in safety activities at the department are then elucidated to make a theoretical model explaining safety knowledge management in the construction industry. The author took part in safety activities at the department of Company Sumitomo Denset co., Ltd., as a safety manager from April 2010 to May 2015, implemented an action plan in four stages, and collected and analyzed data in accordance with the following procedures.

- (1) In order to investigate causes of fall accidents actually happened, safety managers, field managers, and workers worked together at the venues of accidents to analyze their causes. Furthermore, the effectiveness of learning potentially dangerous near-miss incidents as a part of recurrence prevention measures was analyzed.
- (2) In order to systematize knowledge necessary for accident prevention, potentially dangerous near-miss

incident cases and human errors were analyzed. A risk sensitivity sheet was created as a means to transfer systematized knowledge through safety education.

(3) Safety education was implemented, and a questionnaire survey was conducted to verify its result.

(4) In order to transfer further safety knowledge, training was given where each working group analyzed accident cases. Participants were asked to write a report, which was then analyzed.

The answer to MRQ obtained from the above analysis is as follows. Safety knowledge in an information and telcommunication engineering department was created, shared, and used through four processes of the "analysis of experiential knowledge of field managers, workers, and safety managers," the "relational analysis of potentially dangerous near-miss incident cases and human errors," the "systematization of safety knowledge by the risk sensitivity sheet," the "transfer of systematized safety knowledge through education and training," and the "application of safety knowledge."

The "theoretical model for safety knowledge management in the construction industry," which was developed through logical reasoning based on the review of preceding studies and data obtained from the action research in the information and telcommunication engineering department, was named "AIAI Model." This model shows the creation, sharing, and use of safety knowledge and consists of four phases: "Analyzing," "Integrating," "Acquiring," and "Implementing." In the "Analyzing" phase, knowledge of potentially dangerous near-miss incident and industrial accidents is analyzed, and knowledge necessary for accident prevention is created from it. In the "Integrating" phase, knowledge as safety education curriculum is created by using safety ideas, safety goals, and various laws and regulations.

In the "Acquiring" phase, knowledge such as a safety standard is used to create knowledge of accident prevention. In the "Implementing" phase, individual ingenious ideas and wisdom for risk avoidance measures are created through risk prediction activities. Safety knowledge becomes rich both quantitatively and qualitatively as these four phases develop in a spiral.

Its practical implication is that, in order for each worker to put safety knowledge into practice actively and voluntarily, safety management strategies and tactics are required for establishing the mechanism and environment that support it. In the future, it is planned to develop practical training of safety knowledge management and a new method for knowledge transfer.

Key word: Near-miss incident, Human errors, Risk sensitivity sheet, Safety education, AIAI Model

論文審査の結果の要旨

本論文は、電気工事と情報通信工事に特化した建設企業において、安全管理者である筆者が取り組んだ情報通信工事部門における安全活動を対象に、「安全知識はいかに創造・共有・活用されたのか？」をナレッジマネジメントの視点から明らかにした実証的・理論的なアクションリ

サーチである。

昭和 47 年の労働安全衛生法の施行以来、全産業のみならず建設業における労働災害事故の死亡者は減り続けてはいるが、建設業は依然として死亡者総数の 3 分の 1 を占めており、貴重な人命の喪失だけでなく、事故に伴う工事中止による金銭的損失も相当の額に上り、大きな問題であり続けている。

本論文は、本研究のきっかけになった 2010 年の作業員転落事故の原因分析、安全確保が重要な問題である建設業や医療で広く使われているヒヤリ・ハット（事故には至らなかったが、ひやりとした、はっとした体験の報告書）の分析、ヒヤリ・ハット報告のあった作業内容とヒューマンエラーの関係の分析、事故原因分析で用いた危険感受性シート（複数の危険箇所を含む危険場面の写真）によって表出化された現場作業員の暗黙的経験知と筆者が持つ専門的知識の統合による実践的な安全知識の創造、危険感受性シートによる安全教育の実施のその有効性検証、安全教育で学んだ安全知識の実践の検証、筆者の企業において労働災害ゼロであった 2014 年におこなった過去の事故事例の分析という一連のアクションを、それぞれの章で実証的に分析している。

さらに結論の章で、上記のリサーチクエストの「安全知識はいかに創造・共有・活用されたのか？」の答えとして、現場の作業員と管理者と安全管理者の持つ知識が分析された第 1 過程、危険感受性シートによって安全知識が統合された第 2 過程、体系化された安全知識を移転するための教育・研修において安全知識が獲得された第 3 過程、獲得された安全知識が実践された第 4 過程の 4 つの過程が存在したことを発見事項として提示し、その事実から「分析する (Analyzing)」、「統合する (Integrating)」、「獲得する (Acquiring)」、「実践する (Implementing)」の 4 つのフェイズから成る AIAI モデルを建設業における安全のナレッジマネジメントの理論的モデルとして提示した。

以上、本論文は建設業における安全ナレッジマネジメントの実践の実証的・理論的な研究であり、学術的に貢献するところが大きい。よって、博士（知識科学）の学位論文として十分価値のあるものと認めた。