CONTRIBUTION OF UAS MONITORING TO SAFETY PLANNING AND CONTROL

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INTRODUCTION

• The safety management in construction sites by traditional methods face difficulties such as **inspection of large construction sites, manual processes prone to errors** and **inadequate information sharing**.

• The adoption of the UAV for the management of safety at construction sites has stood out due to its ability to:
  
  • capture images and videos of large areas,
  
  • reducing data collection and processing time,
  
  • and identifying the identification of risk situations.

• The UAS monitoring supports **activities workflow, enables the identification of safety and production trade-offs**, and **anticipates risk situations faced by workers**, as well as **interferences between processes**.
RESEARCH PROBLEM

- Few studies have explored UAS monitoring to assist Safety Planning and Control (SPC) (Melo and Costa, 2019; Martinez et al., 2020)

MAIN OBJECTIVE

- This study suggests a set of managerial practices and indicators to incorporate the information provided by UAS monitoring into SPC.
- The work was developed based a case study.
RESEARCH METHOD

Scope of this paper

1st implementation

Implementation

• 14 weeks in Project A (residential condominium)
• Artifact: practices and indicators to incorporate the UAS safety monitoring using the Smart Inspects System into the SPC process

Evaluation

• Interviews with the management team (n=5)
• Interviews with workers (n=22)
• Constructs: collaboration, transparency, utility
RESEARCH METHOD

Proposed artifact:
Set of practices and indicators to incorporate the UAS safety monitoring using the Smart Inspects System into the SPC process.
RESULTS AND DISCUSSION

- **Safety Compliance Indicator** = 93% (average)
- **Total of 36 non-conformities identified**
- Organization and housekeeping (33%), material storage (25%), and collective protective equipment (14%).

- **Nonconformities Treatment Indicator** = 78% (average)
- The time taken to carry out the corrective actions was 1 to 3 weeks
EVALUATION OF THE ARTIFACT

Collaboration

- Data and measures adopted have a high to a very high level of efficiency in sharing safety information.
- Highlight for the relevance of the images collected with UAS and the visual display to improve communication.
- Collaboration between the production and safety teams and increase the Foreman’s participation on the decision-making process.

Transparency

- Better understanding of the safety conditions due to the aerial images captured by UAS.
- The workers interviewed (n=22) reported a high level of understanding about the information presented on the visual display.
EVALUATION OF THE ARTIFACT

Utility

• The safety planning meetings and the definition of action plans allowed identifying challenges in resource acquisition and the elaboration of effective planning with a focus on safety.

• Improved ability to anticipate and eliminate safety constraints.

• 77% of the workers’ interviewed (n=22) noted a very high in the organization and housekeeping aspects, adequate waste disposal, and construction site signaling.

• Difficulty to the incorporation of the overwork and prioritization of production goals by managers.
CONCLUSIONS

The Smart Inspects System and the practices implemented improve visual management through the visual display, images collected with UAS, and A3 report.

Data and measures proved to be helpful to enhance safety training and workers' risk awareness.

Promoting more consistent safety planning meetings and anticipating and eliminating safety constraints.

Limitations: the non possibility to inspect safety requirements within buildings and the practices and indicators were implemented only in Project A.

Future research: investigate how to use the information provided by UAS to improve SPC in the medium and long planning term, as well as use the information to increase the engagement and participation of workers in safety practices.
THANK YOU!

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