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APPLYING SCRUM APPROACH IN COAL MINE WASTE MANAGEMENT

Ihor Chobotko¹

¹Leading Engineer of the Department of Coal and Rock Physics, e-mail: efilonov79@gmail.com

¹Branch for Physics of Mining Processes Institute of Geotechnical Mechanics Named by N. Poljakov

Abstract. The article considers the concept of project management and the general concept of the Scrum methodology, identifies advantages and disadvantages of its application in relation to coal mining waste. According to the results of the study, it is found that the use of the flexible Scrum methodology is advisable in conditions of uncertainty in the management of coal mining waste.

Keywords: Scrum methodology, coal mining waste, advantages and disadvantages

SCRUM ПІДХІД В УПРАВЛІННІ ВІДХОДАМИ ВУГІЛЬНИХ ШАХТ

І.І. Чоботько¹

¹провідний інженер відділу фізики вугілля та гірничих порід, e-mail: efilonov79@gmail.com

¹Відділення фізики гірничих процесів Інституту геотехнічної механіки ім. М.С. Полякова НАН України, Дніпро, Україна

Анотація. У статті розглянуто концепцію управління проектами та загальна концепція методології Scrum, визначено переваги та недоліки її застосування щодо відходів вугільної промисловості. За результатами дослідження встановлено, що використання гнучкої методології Scrum є доцільним в умовах невизначеності в управлінні відходами вугільної промисловості.

Ключові слова: методологія Scrum, відходи вугільної промисловості, переваги та недоліки

Introduction. Scrum is a lightweight framework that helps people, teams and organizations create value through adaptive solutions to complex problems [1].

The coal industry produces large amounts of waste that can have a significant impact on the environment. Traditional approaches to waste management in the industry have often been inefficient, resulting in delays, cost overruns and sub-optimal waste disposal practices. Flexible project management methodologies such as Scrum have demonstrated the potential to improve project outcomes across industries [2]. However, there is a lack of research on the application of Scrum in coal mine waste management. Therefore, the purpose of this





study is to examine the feasibility and effectiveness of applying Scrum in this context, and to identify the potential benefits and limitations of this approach [3].

Coal mining is an important source of energy production for many countries around the world. However, it also generates a significant amount of waste, which poses serious environmental challenges [4]. Effective waste management is therefore crucial to minimise the negative environmental impact of coal mining. In recent years, agile project management methodologies, such as Scrum, have gained popularity in various industries, including waste management [5, 6]. Scrum is an agile and iterative approach that allows project teams to achieve high-quality results in a short period of time. This article explores the application of Scrum in coal mine waste management, highlighting the benefits of this approach in addressing the complexities of waste management in the mining industry. It presents a case study of the successful implementation of Scrum in a coal mine waste management project and provides insights into the theoretical considerations and potential limitations of applying a Scrum approach to the coal mine waste management process [7].

Purpose of the work. The goal of applying the Scrum approach to mine waste management is to improve the efficiency and effectiveness of the waste management process in the coal industry. Scrum is a popular agile methodology that emphasises iterative and incremental development, collaboration and continuous improvement. By applying the principles and practices of Scrum to the waste management process, the coal mining industry can better manage waste, reduce environmental impact and ensure regulatory compliance. Scrum can help teams identify and prioritise waste management tasks, work collaboratively and deliver high quality results in a timely manner. In addition, scrum provides transparency and visibility into the waste management process, allowing stakeholders to stay informed and make informed decisions.

Material and results of the research. The authors [8] of proposed the Waste Management and Hazard Alert System (WM-HAS) web application as a new business model that supports all stakeholders in the waste management ecosystem to participate seamlessly in the business of waste. Their innovative business model is designed to engage stakeholders to address the challenges of sustainable waste management in developing countries. Stakeholders identified include waste producers, waste collectors, and waste processors. The application of the scrum-Agile methodology is used with the Laravel model view controller (MVC) framework for both front-end and back-end services. The results show the flexibility of the user interface to facilitate business tasks. The audience at the demonstration event of the Nigerian stakeholder forum expressed their desire to use the WM-HAS application as soon as it is launched.

This indicates that the development of technologies in the future will allow the creation of applications for monitoring the use and management of coal mining waste at mining enterprises with the active use of the scrum approach.

In Figure 1, we see a 5-point framework for coal mining waste management:

- Idea. What we are going to implement (in our case, coal mining waste management);

- Planning for coal mining waste management. The team gathers to plan the key points in coal mining waste management (from raw material processing to disposal). It should be noted that the role of each team member as an expert in their field is important in planning;

- Daily meetings. It is necessary to understand the current stage of the coal mining waste management project;

- Retrospective meeting. It is necessary for the team to understand: "How can we do better?", "What prevented us?", "What slowed us down?";

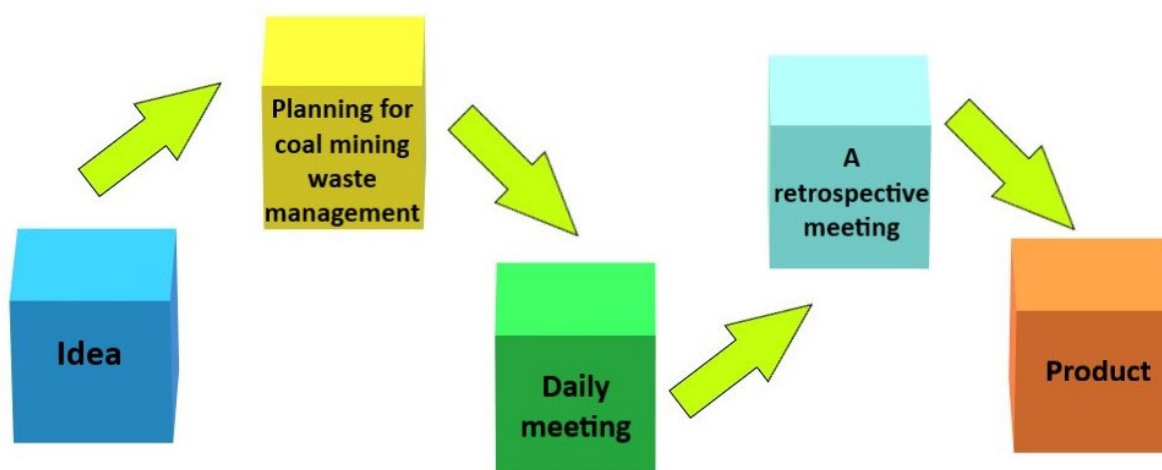


Figure 1. – Scrum organisation chart for coal industry waste management

- product. This is the full implementation of the coal mining waste management project at the output [9].

We can identify the main advantages and disadvantages of the Scrum approach to coal mining waste management:

- *Advantages:*

- Improved efficiency: By breaking down the waste management process into smaller, more manageable pieces, a Scrum approach can help to identify and eliminate bottlenecks and inefficiencies, leading to a more streamlined and efficient process;

- Enhanced collaboration and communication: A Scrum approach emphasizes the importance of collaboration and communication among team members, which can help to ensure that all stakeholders are involved in the planning and execution of the waste management process;

- Greater flexibility and adaptability: A Scrum approach encourages a flexible and adaptable approach to project management, which is important in a dynamic and complex industry like coal mining;

- Continuous improvement: Scrum emphasizes the importance of continuous improvement and adaptation, which can lead to the development of more effective and innovative waste management strategies.

- *Disadvantages:*

- Resistance to change: The implementation of a Scrum approach may face resistance from employees who are used to a traditional project management approach, which could hinder the adoption and success of the new approach;

- Lack of expertise: Implementing a Scrum approach requires expertise and knowledge of the principles and methodologies involved, which may be lacking in the coal mining industry;

- Increased complexity: Implementing a Scrum approach could add additional complexity to an already complex waste management process, which could lead to confusion and errors if not properly managed;

- Time and resource-intensive: A Scrum approach requires a significant investment of time and resources to implement and maintain, which could be a challenge for companies operating on limited budgets;

Applying a Scrum approach to coal mine waste management can potentially improve the efficiency and effectiveness of the waste management process. Scrum is an agile framework commonly used in software development, but its principles can be applied to a variety of industries and processes [10].

One of the key principles of Scrum is an iterative and incremental approach to project management. This means that the project is broken down into smaller, manageable parts, and progress is regularly analysed and evaluated. In the context of coal mine waste management, this may include breaking down the waste management process into smaller tasks, such as identifying areas with high levels of waste accumulation, implementing waste segregation methods, and establishing effective disposal methods [11].

Another important aspect of Scrum is the emphasis on collaboration and communication between team members. In the context of coal mine waste management, this may involve the involvement of stakeholders such as miners, environmental experts and waste management professionals in the planning and execution of the waste management process. This collaborative approach can



lead to the development of more effective waste management strategies that take into account the unique challenges and characteristics of each mine.

Conclusion:

The case study demonstrated the potential of Scrum as a tool to improve the efficiency and effectiveness of coal mine waste management. However, the successful application of Scrum in this context requires careful planning and management, including clear project objectives, effective communication and collaboration between team members, and regular monitoring and evaluation of project performance. The findings of this study provide valuable insights into the practical considerations and potential limitations of applying Scrum to coal mine waste management, which can be used to guide future research and implementation of Scrum in this area. Finally, Scrum also emphasises the importance of continuous improvement and adaptation. This means that the waste management process is not static and should be constantly evaluated and improved as new information becomes available and new challenges arise. By applying a Scrum approach to coal mine waste management, companies can potentially develop more efficient, cost-effective and environmentally friendly waste management strategies that can be adapted to changing conditions and requirements.

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ВІЗУАЛІЗАЦІЯ ЕТАПІВ ВИГОТОВЛЕННЯ ВИРОБІВ – СУЧАСНИЙ ІНСТРУМЕНТ ФОРМУВАННЯ ПОПИТУ

К.А. Зіборов¹, І.В. Вернер², М.В. Пімахов³

¹кандидат технічних наук, доцент кафедри конструювання, технічної естетики і дизайну, e-mail: ziborov.k.a@nmu.one

²старший викладач кафедри конструювання, технічної естетики і дизайну, e-mail: ill3@ukr.net

³студент групи 132-19-2, e-mail: pimakhov.m.v@nmu.one

^{1,2,3}Національний технічний університет «Дніпровська політехніка», Дніпро, Україна

Анотація. У статті обґрунтовано використання ігрового рушія для утворення дизайну інтер'єру з інтерактивними елементами. Наведено приклади використання та можливостей системи Unreal Engine.

Ключові слова: гра, віртуальний тур, Unreal Engine, інтер'єр, дизайн.