

UNIVERSITY OF BELGRADE  
TECHNICAL FACULTY BOR

**52<sup>nd</sup> International October Conference on  
Mining and Metallurgy**



**PROCEEDINGS**

Edited by

**Saša Stojadinović**

and

**Dejan Petrović**

**November 29<sup>th</sup> – 30<sup>th</sup> 2021**

**Bor, Serbia**

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## IMPACT OF EXTRAORDINARY SECURITY MEASURES TO EMPLOYEES DURING THE PANDEMIC COVID-19

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### Abstract

*Today's modern business organizations in times of pandemic caused COVID-19 are not in a situation to take place without the required extraordinary security measures. The implementation of extraordinary security measures is becoming increasingly important, especially in today's current wisdom changing market during the pandemic. The aim of this paper is to assess the progress of the impact of extraordinary security measures on employees during the COVID-19 pandemic. The evaluation of indicators / criteria was done by AHP method. Suppression progress the COVID-19 pandemic demonstrates the effectiveness of the proposed approach.*

**Keywords:** Security measures, Employees, COVID -19

### 1. INTRODUCTION

During the pandemic caused COVID - 19 Government of the Republic of Serbia has declared the introduction of emergency measures for the safety of human health. All countries in the world during the pandemic declared an emergency situation in accordance with their national laws. Regulation on security measures for combating a pandemic, the Government of the Republic of Serbia published in the "Official Gazette of RS", No.151 / 2020. The countries of the European Union have given a time frame for the implementation of sustainable security measures for the suppression of infectious diseases. Prescribed safety measures are implemented by employers / company managers. Employees need to know, understand and follow the prescribed measures in their workplace. They may also request additional information from their employer / manager. Employers / managers include their representatives of the Integrated Management System (ISM). ISM integrates: Quality Management System (ISO 9001, QMS), Environmental Protection System (ISO 14001, EMS) and Health and Safety Protection System (OHSAS 18001: 2007). It is the duty of the employer / manager to communicate with employees in terms of encouraging and caring for their health. It is assumed that jobs with a large number of contacts have a higher risk. Employees who have a close interaction with customers or other employees during a shift are at higher risk of infection. Close communication of employees with other clients enables the same greater danger of obtaining and transmitting viruses. It is assumed that excessive environment, crowded the workplace, confined space, frequency of contact with areas of high touch; frequently touching the employees have a higher risk of infection.

Analyses of the impact of security measures on employees during a pandemic COVID - 19 provide an opportunity for employers / managers a way to combat the infection. Employers / managers do not have the opportunity to know the health condition of individual employees; it is confidential or has the ability to implement appropriate safety measures.

Analysis of the impact of security measures on employees during a pandemic was made AHP (analytic hierarchy process) method. The following safety measures were analyzed: cleaning and disinfection, use of personal protective equipment (PPE), wearing non-medical masks or face masks, and physical distancing or separation.

The AHP method belongs to the methods of multi-criteria decision making (MCDM). MCDM methods belong to the field of operational research and management science, which include various techniques that facilitate the decision-making process [1, 2]. These methods are widely used in various areas of business: staff selection [3], supply chain [4], information technology [5], organizational culture selection [6] and many other areas.

## 2. EXPERIMENTAL

In order to assess the overall progress of the declared measures to combat the pandemic caused by COVID - 19, the following indicators are assessed: cleaning and disinfection, use of personal protective equipment (PPE), wearing non - medical masks or face masks, physical distancing or separation and communication with employees; prevention posters (Table 1).

Table 1. Indicators (criteria) and explanation

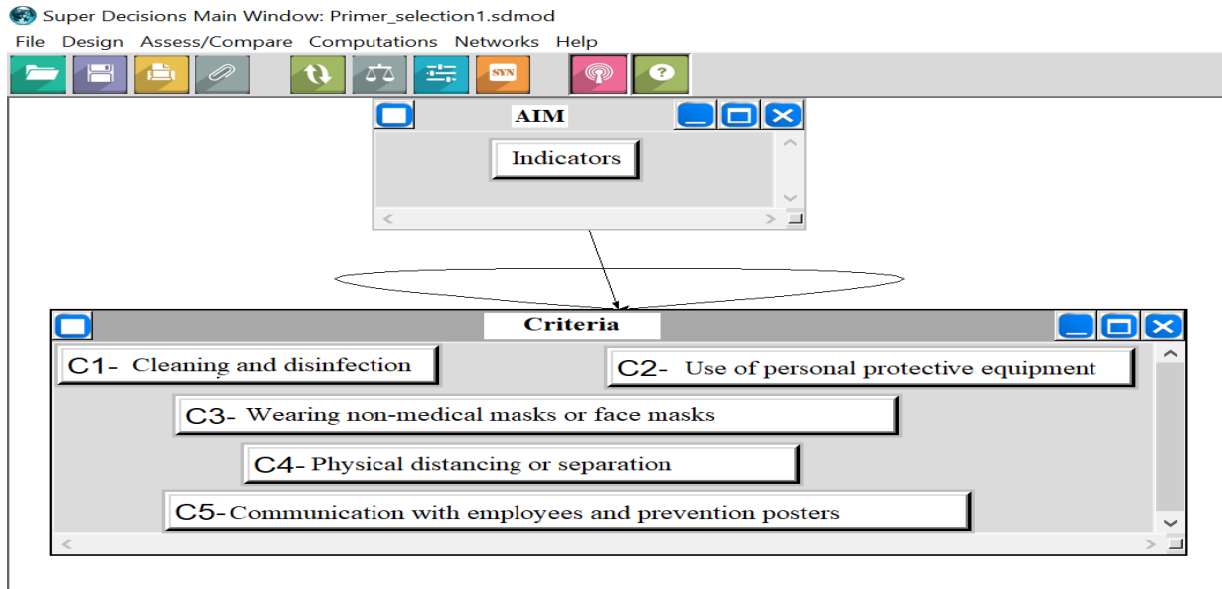
Indicators (criteria)	Explanation of indicators (criteria)
C <sub>1</sub> -cleaning and disinfection	Landscaping and cleaning, constant disinfection, hand washing reduces the risk of spreading COVID - 19.
C <sub>2</sub> - use of personal protective equipment (PPE)	Some employees cannot use protective equipment (dresses, boots, gloves, etc.).
C <sub>3</sub> - wearing non-medical masks or face masks	Wearing medical masks or face masks can prevent a person who is unknowingly infected from spreading the virus to other employees.
C <sub>4</sub> - physical distancing or separation	Separating people or separating from each other, reducing contact on common surfaces mitigates the risk. Somewhere this is not possible, so several measures are combined to increase security and reduce the risk of spreading the virus.
C <sub>5</sub> - communication with employees and prevention posters	Communication with employees on how to react as safely as possible to emergencies while the virus lasts. Prevention posters as notifications for employees as measures to be taken while COVID - 19 measures are in force.

Using the AHP method, we evaluate the indicators (criteria) with the help of the Sati scale, where we compare the two elements in relation to the goal. The goal is to make overall progress in curbing the spread of COVID - 19 to employees through security measures. When interpreting the results with the help of Satie's scale, one element is always more important than the other, depending on the set goal. These conclusions define the AHP method and make it suitable for evaluating the criteria.

Table2. Matrix comparing pairs

Indicators (criteria)	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
C <sub>1</sub>	1	1/2	1	2	1
C <sub>2</sub>		1	2	3	1/2
C <sub>3</sub>			1	3	1
C <sub>4</sub>				1	1/2
C <sub>5</sub>					1

The AHP method has a strong mathematical basis and is one of the soft optimization methods. The degree of consistency is less than 0.10, which means that the decision maker gave an accurate assessment of the criteria. Table 2 shows a 5x5 matrix comparisons. Figure 1 shows the Hierarchy of the AHP method.



Slika 1. Hijerarhija AHP metode

### 3. RESULTS AND DISCUSSION

The obtained results are shown in Figure 1. The analysis was done by AHP calculation using Super Decision software. Criterion C<sub>2</sub>, the use of personal protective equipment has the greatest progress for the suppression of the COVID-19 pandemic, because its weight coefficient is 0,27203. Communication with employees and posters for prevention, criterion C<sub>5</sub> is in second place in terms of progress in combating the pandemic, because its weighting factor is 0,25925. Criterion C<sub>3</sub>, non-medical wearing masks or face masks with a weighting coefficient of 0,19843 occupies third place. Cleaning and disinfection, the criterion C<sub>1</sub> is in fourth place. The weight coefficient of criterion C<sub>1</sub> is 0,18151. Physical distancing or separation, criterion C<sub>4</sub> with a weighting factor of 0.08878 is in fifth place in terms of progress to combat the pandemic. AHP analysis shows that: criterion C<sub>2</sub> affects 27.2% on the reduction of COVIDA -19, criterion C<sub>5</sub> with 25.9%, criterion C<sub>3</sub> with 19.84%, criterion C<sub>1</sub> with 18.1% and criterion C<sub>4</sub> with 8.8%. We conclude that the prescribed safety measures impact on reducing the spread of a pandemic, which is a big improvement.

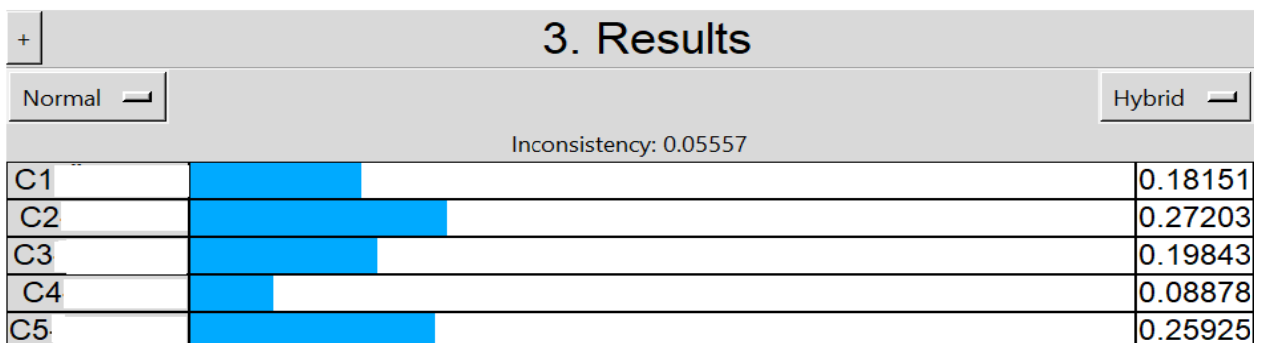


Figure 2. Weighting coefficients of the criteria

#### 4. CONCLUSION

Emergency security measures prescribed by the Government of the Republic of Serbia have significant role in the progress of combating the spread of the pandemic COVID-19. The implementation of prescribed security measures is important to combat the pandemic. Security measures are implemented by the employer / manager together with IMS representatives. In this paper, the AHP method for evaluation of indicators / criteria is proposed. During the evaluation of the indicators / criteria, there were three decision makers where they evaluated five criteria. Using personal protective equipment, criterion C2 has the greatest progress in combating the spread of the COVID-19 pandemic because its weighting factor is 0,27203. We can conclude that the implementation of the prescribed emergency security measures brings great progress in the fight against the pandemic to employees. The obtained results confirmed the applicability of this proposed method. For future research with a little modification can be used by other MCDM methods.

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