# APPLIED MECHANICS

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## SIGNIFICANCE OF POSSIBLE CONSEQUENCES OF WELDING POROSITY

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Risk control is the basis of a modern production management system [1, p. 54]. The risk is determined as a combination of the probability of occurrence of the event and the significance of its possible consequences [2, p. 47]. Determining the probability of unacceptable porosity of the weld requires using statistical data analysis tools [3, p. 77]. Comprehensive analysis of existing approaches to ranking the consequences of events, considering the specifics of the impact of the porosity of the weld, allows us to divide the possible effects into three groups: critical, significant, insignificant consequences.

*Critical consequences.* This group should include situations where exceeding the permissible porosity is a potential threat to human life and health. These situations are associated with the destruction or loss of tightness of welded products. Such consequences can lead to non-compliance with the requirements for the porosity of working welds under the action of variable loads in vessels operating under high pressure, pipelines, tanks for storage of hazardous liquids and gases, load-bearing structures made of high-strength steels. Situations of loss of the main function of the product without endangering human life and health should also be considered critical. That is, we are talking about the destruction of welded products or loss of tightness without endangering users.

*Significant consequences.* This group may include situations in which exceeding the allowable porosity leads to inconvenience during the operation of the product. Such can be considered insignificant leaks, restrictions in the application without loss of the main function. For example, non-compliance with the porosity requirements may result in deviations from

the specified product geometry and, as a consequence for the user, the necessity of making additional efforts during the operation or maintenance of the product.

*Minor consequences.* As a rule, they occur in a situation where welded products, are part of technical systems and the loss of functionality of the weld due to porosity does not lead to loss of functionality of the system. Such welds are usually not load-bearing.

The application of the proposed classification of consequences will simplify the quantitative analysis of the risks of non-compliance with the requirements for the porosity of welds.

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## МОНІТОРИНГ РЕЗУЛЬТАТІВ ПРОФЕСІЙНОЇ ПІДГОТОВКИ ЗВАРНИКІВ ПІД ЧАС НАВЧАННЯ ТА ПРИ ПІДГОТОВЦІ ДО КВАЛІФІКАЦІЙНОЇ АТЕСТАЦІЇ

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