

Instructions for applying the probability table for JSA



Annex III, Rev.11: 10/02/2024

Department: Health, Safety and Environment board

Responsible Manager: Rafael Costa – ID:81021754 – Health and Safety Process Management.

Target Audience: All professionals who work in Vale's Health and Safety and Operational Risks area and who perform tasks that require a JSA.

Need for Training: () YES (X) NO

Probability table:

Probability	Description
Very Remote	Controls in place: <ul style="list-style-type: none">. PPE. Administrative controls;. There are engineering controls for more recurrent causes and/or for the consequences. Procedure: <ul style="list-style-type: none">. There is training/procedure on the task to be performed History of events: <ul style="list-style-type: none">. There is no history of events
Remote	Controls in place: <ul style="list-style-type: none">. PPE. Administrative controls;. There are engineering controls for more recurrent causes and/or for the consequences. Procedure: <ul style="list-style-type: none">. There is training/procedure on the task to be performed History of events: <ul style="list-style-type: none">. There is a history of events, but the controls associated with the event have been effectively implemented.
Possible	Controls in place: <ul style="list-style-type: none">. PPE. Presence of administrative controls for all causes and consequences. Procedures: <ul style="list-style-type: none">. There is training/procedure on the task to be performed History of events: <ul style="list-style-type: none">. There is a history of events, but the controls associated with the event have been effectively implemented.
Likely	Controls in place: <ul style="list-style-type: none">. Presence of administrative controls and PPE, but for some causes and consequences there are no controls Procedure: <ul style="list-style-type: none">. There is no training/procedure on the task to be performed History of events: <ul style="list-style-type: none">. There is a history of events, but the controls associated with the event have been effectively implemented
Very Likely	Controls in place: <ul style="list-style-type: none">. Presence only of PPE or for most causes and consequences there are no controls Procedure: <ul style="list-style-type: none">. There is no training/procedure on the task to be performed History of events: <ul style="list-style-type: none">. There is a history of events and the scenario (causes and controls) associated with the risk situation analyzed is the same or very similar.

1. General guidelines:

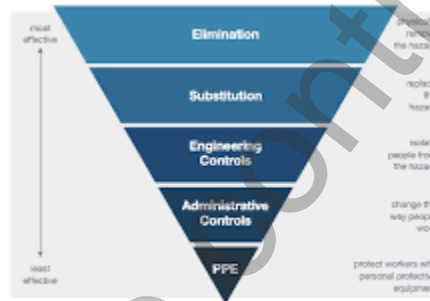
- The JSA method is qualitative. The analysis and discussion of the team that participates in the elaboration is fundamental and it is common that there is divergence between team members or between different teams about the definition of probability.
- The probability table should be seen as an orientation for setting this parameter, but there is no expectation that all scenarios fit exactly into one category. It is fundamental that the elaboration team has previous knowledge about basic concepts of safety and risk management.

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- c) The definition of the probability category is not limited to the parameters defined in the table, and the multidisciplinary team can use other criteria to define the probability of risks or safety hazards.
- d) In cases where the same scenario falls into more than one category, the multidisciplinary team must analyze other factors (safety knowledge and risk analysis in general) that influence probability, such as: whether the controls are mostly preventive or mitigating, the degree of experience held by the employees involved in the task, the hazard exposure time, complexity of the task, efficiency of controls, and frequency of task execution, among others.

2. Hierarchy of controls:

- a) The control hierarchy defines the implementation priority of controls to reduce the level of risk and establishes a level of efficiency for these controls.



- b) To simplify the JSA method, it is necessary to define the probability of the PPE, administrative and engineering controls.
- c) The efficiency of different controls varies within the same category, which must be considered by the JSA elaboration team when the probability is being defined.
- d) If a control category is not applicable for the analyzed situation, the team can disregard this category to define the probability.
- e) Procedures should not be generally described as controls. If there is, in the procedure, a control for the risk situation, it must be specified. Example: in the case of a control of CAR 01, it must be described in the JSA which control this is, and not just describe "CAR 01".
- f) General training (CAR training, legislation, etc) should only be defined as administrative controls if they are related to the risk situation and the causes.
- g) Engineering controls include:
 - Designing the installation, equipment or process to minimize the hazard.
 - Changing the process by means of equipment, materials or devices that reduce the hazard.
 - Isolating the hazard through interlocking, machine protection, sensors and other means.
 - Deploying machines, equipment or devices that remove the employee from the line of fire or from situations of hazard exposure.

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- h) Administrative controls include:
- Providing written procedures, safe work permits and working practices.
 - Decreasing exposure time.
 - Installing signs, warning notices and warnings.
 - Providing training and guidelines on how to execute the task.
- i) Subjective orientations and warnings communicated through graphic design, featuring expressions such as "Take care" and "Pay attention" are not considered administrative controls.
- j) Guidelines described in the JSA must be considered as administrative controls of low effectiveness.
- k) PPE (personal protective equipment) includes helmets, gloves, glasses, boots and other safety gear or equipment to protect the individual worker.

3. Training:

- a) The procedures and training should only be considered to reduce the probability of risks and hazards, according to criterion 2, in cases where the procedure and training are specific to the task to be performed. For example, for a task called "off-road truck tire removal," only procedures and training in "PRO off-road truck tire removal" should be considered.
- b) Mandatory training on how to exercise the function (CAR, legal training, among others) should not be considered to reduce the probability based on criterion 2 but can be considered as an administrative control according to criterion Hierarchy of controls.

4. Event occurrence history:

- a) The history of incidents should increase the probability of occurrence when no new controls were implemented, and no change occurred in the method of performing the task that was associated with the analyzed event.
- b) Events related to the cause and/or the situation being analyzed should be considered.
- c) N1, N2 and N3 events must be considered for probability analysis. Events without high potential can be considered.
- d) Scope to be considered:
- N1: Vale.
 - N2 and N3: Location of the installation unit. The team may consider events from others location if it has knowledge of occurrences in similar Vale processes or areas.
- e) The official source of consultation for event verification is Vale's official registration system.