Week 2

Question 1

Identify the most likely cause of a mechanical part failure.

Improper installation

Question 2

Which of the following practice is the safest, most efficient and cost-effective in the context of robot accidents?

$1 to prevent a problem

Question 3

Identify the most likely cause of an impact or collision accident.

Unpredicted changes or component malfunction

Question 4

An accident has occurred at your workplace. What would your reaction be?

Continual improvement followed by correction

Question 5

Reflect on the following case study where robotic platform in Nebraska in 1999 crushed a machine operator.

Identify the most effective safety lesson worth implementing.

A 23-year-old carousel operator, at a meat packing plant, was killed when his foot tripped a light sensor causing a computer controlled robotic platform to come down from above, crushing his skull. He had been watching a maintenance technician work on a conveyor and apparently stepped on the conveyor to get a better view of what the mechanic was doing. The conveyor the mechanic was working on had been shut off but the entire system had not been locked out. Power still remained to the light sensors and the robotic platform. When the platform came down it pinned the victim between the platform and the conveyor. When they lifted the platform off the victim, the victim fell approximately 15 feet to the concrete floor below. Death was most likely caused by the blow to the head from the robotic platform, not the fall. The victim was pronounced dead at the scene. [SOURCE: [https://www.cdc.gov/niosh/face/stateface/ne/99ne017.html]](https://www.cdc.gov/niosh/face/stateface/ne/99ne017.html%5d)

Answer: Lock-out/ tag-out procedure

Question 6

Reflect on the following case study where a robot struck a mold setter's head in Michigan in 2001.

Identify the most effective safety lesson worth implementing.

On January 19, 2001, a 29-year old male died from injuries sustained when he was struck on the head by a cycling single-side gantry robot. The victim had recently performed a mold change on a 1500-ton horizontal injection-molding machine (HIMM). He was apparently looking for tools that he may have left within the machine during the set-up operation. The victim climbed on top of the purge guard and leaned over the top of the stationary platen of the HIMM in an attempt to see if the tools were left within the mold area, and placed his head beneath the robot's gantry frame. His position placed him between the robot's home position and the robot's support frame on the stationary platen. While trying to look inside the mold area, the robot cycled, and the victim's head was struck from the side and crushed between the robot and the robot's support frame. Another employee noticed the victim on top of the HIMM and went to investigate. Upon seeing the victim's condition, fellow employees were called to move the victim to the floor. Emergency responders were called, and awaiting emergency responder arrival, employees began chest compressions and other first aid procedures. The victim was pronounced dead on arrival at the local hospital.

Answer: Safeguard workspace while robot is active

Question 7

When it pertains to safety, "preventative" approach is better than "coercive".

TRUE

Question 8

What are the primary means of risk reduction in a safety-rated monitored stop type of collaborative operation?

No robot motion when operator is in collaborative workspace

Question 9

What are the primary means of risk reduction in a hand guiding type of collaborative operation?

Robot motion only through direct input of the operator

Question 10

What are the primary means of risk reduction in power and force limiting by inherent design or control type of collaborative operation?

No risk reduction measure essential