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|  | JOB HAZARD ANALYSIS |

| Job Name: replace Roof Shingles | Date: 2022.6.11 | Analyzed by (name):Xinyu Liu and Lili Wang |
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| SEQUENCE OF TASKS | POTENTIAL HAZARDS | RECOMMENDED PROCEDURE OR PPE |
| 1. Climb to the inclined roof | * The employee might fall to a lower level. | Fall protection system, such as fall protection ladder and anchor. (Personal Protective Equipment)  Also, guardrail systems accordance with 29 CFR 1910.29(b) should be employed to prevent potential falling. (Engineering Control) |
| 1. Stay on the inclined roof | * The employee might lose balance on the inclined surface | Specific training should be given to the employee in case that sometimes working on inclined surface is inevitable. (Administrative Control)  In addition, the employee should know how to keep balance in inclined surface. They should know how to reduce the potential injury in case they fall to a lower level.  Safety belt aiding to fix the employee could be used to prevent potential falling. (Personal Protective Equipment) |
| 1. Kneel on the roof | * The employee might fall to a lower level * Kneeling for a long time might hurt the knee. | Rest mat or knee pads should be utilized in case long time of kneeling is required. (Personal Protection Equipment) |
| 1. Remove the shingles | * Repetitive motions for a long time cause ergonomic hazard * Awkward posture leads to WMSDs, especially in spine. | Training on how to reduce the potential hazard of awkward posture should be given. (Administrative control)  A work shift system aiming to reduce the maximum working duration under the awkward posture should be applied. (Administrative control) |
| 1. Drop the shingles | * Someone or something on the lower level might be hit by the shingles * The muscle, especially on the wrist and the back, might be overexerted and overloaded. | Temporarily put the replaced old shingles on the roof. (Elimination)  Specific training on how to prevent WMSDs should be given to the employees. (Administrative control)  Fall protection system. (PPE) |
| 1. Place the refreshed shingles | --- | --- |
| 1. Glue the shingles | * Repetitive hand operation on the glue gun * Hand-Arm Vibration might also be common here. | Vibration absorbing gloves might be used to prevention potential illness relating to vibration. (PPE) |
| 1. Fix the shingles by nails | * The finger of the operator might be strike by the hammer * Repetitive operation on hands, namely the ergonomic hazards, lead to WMSDs on hands. | Use pliers that hold nails in place of hands. (Substitution)  Reduce the longest working time in case that the employee might hurt themselves by hammer because the lack of focus caused by long working time. (Administrative control) |
| 1. Rearrange the shingles | * The other operator lifting the shingles is not protected with the gloves, leading to potential hazard like frostbite and glued by the glue, caused by contact with harmful energy (cold) and substance (glue). | It should be emphasized that the safety of each employee is vital, and one should take care of its own safety. (Administrative control)  Gloves should be given to each employee, despite whether he need to take the major work. (PPE) |
| 1. Inspect the shingles | * Fall to a lower level when walking on the inclined roof * Awkward posture and repetitive operation while inspection and test the quality of the refreshed shingles. | Fall protection system, such as fall protection ladder and anchor. (Personal Protective Equipment)  Guardrail systems accordance with 29 CFR 1910.29(b) should be employed to prevent potential falling. (Engineering Control) |
| 1. During All Steps | * There are wind in the environment, which might blow up or blow away the nails, leading to potential and missing of the components. * The environment is clod and windy, which might restrict the aerobic capability of the operator. As a result, long working time under such condition might lead to fatigue and losing of cognitive ability * Contacting with the singles which is quite cold under such weather, though protected by the gloves, might lead to harmful energy transfer. | Total exposed time under cold and wind environment should be controlled and reduced by each employee. (Administrative control)  Extra cloth should be worn to keep warm.(PPE)  Gloves should be equipped if the tasks require contacting the breezing surface. (PPE)  The labor requirement should be calculated to meet the aerobic requirement of the given task. (Elimination) |