

Guidance Note: Exposure to pinion and ring gears on boom type MEWPs

Potential Risk:

Entanglement due to exposure to pinion and ring gear on boom type MEWP's when rotating extending structure.

Observation:

1. The hazard arises only when slewing occurs and if a person was in the vicinity of the pinion when slewing occurs then they are exposed to other obvious hazards such as entrapment between the turntable and the chassis or under booms. The area is considered a no-go zone.
2. The location of the pinion is generally less than 1m above the ground and approximately 500-1000mm inboard from the edge of the turntable meaning access by a person standing in proximity to the pinion is not possible – the person would have to kneel on the ground and reach in and the possibility of being drawn in is considered remote.
3. Applying risk assessment principles, the severity of the hazard is high (irreversible injury) but exposure to the hazard is low duration (the pinion will pass the exposure region in a matter of seconds). The frequency of exposure is considered low (there is no rational reason why anyone would need to regularly or even infrequently reach into the area during normal operation – there is usually nothing to access).

The probability of the hazard arising is considered low (why would anyone reach into the area anyway?). The possibility of avoidance is high, if the machine began unexpectedly slewing then it would be possible to remove limbs from the area without impediment unless of course their fingers were already in contact with the pinion or they were drawn in (which might foreseeably arise during maintenance in which case if guard was provided it would be removed anyway). The risk estimation during normal operation is considered negligible.

4. This hazard has been considered by the AS, EN, ISO MEWP standards and has resulted in the requirement that guards are necessary to protect against mechanical hazards for persons standing on the ground and in the vicinity of the MEWP. As noted above it is generally necessary for a person to kneel to have any possibility of accessing the area.
5. If a guard was installed then it inhibits regular inspection.
6. For the purpose of maintenance a guard would have to be removed, which then increases the exposure of personnel to the hazard (however remote) because they have to spend more time removing and re-installing the guard – and it also encourages inadequate or no inspection – or permanent removal of the guard. Procedural controls to prevent movements should be implemented for maintenance purposes as standard procedure.
7. The provision of a guard is therefore considered to be ineffective as a risk control. A sign alerting to the presence of the hazard maybe appropriate.

This is a general conclusion and there may be some examples where a guard is appropriate if there is an elevated risk of being drawn in, for example if the pinion is closer to the edge of the turntable or the height above ground is larger.

Control Measures:

Manufacturers and Owners should review the location of pinion and ring gears on boom type MEWP's as follows:

1. If there is exposure to the gears while persons are standing in the vicinity of the MEWP, a guard should be provided to control the risk of entanglement.
2. If the risk of entanglement is only present when persons are in a kneeling position, a sign should be placed on boom type MEWP warning of the potential exposure to unguarded pinion and ring gears.