Risk Level Indicators

The risk level assigned to hazards is calculated based on three key factors. These factors include the probability of injury, injury severity, and the guarding factor. For each factor, different variables are considered.

Probability

Probability of contact is determined by how easily accessible a hazard is to machine operators. Using our method of calculation, probability can be assigned either a 4 or a 2 based on the following variables:

- 4 - Contact with the hazard is likely to cause injury.
- 2 - Contact with the hazard could possibly cause injury, but it's unlikely.

Severity

Severity of injury is determined by how severely a hazard could injure a worker. This variable must be assigned based solely on the injury potential of the hazard itself, regardless of safeguard status. Using our method of calculation, severity can be assigned either 4, 3, or 2 based on the following variables:

- 4 - High Severity: if contact with the hazard could result in disability or death.
- 3 - Medium Severity: if contact with the hazard could result in hospitalization or a limited period of disability, such as broken bones, missing digits, or extensive stitches.
- 2 - Low Severity: if a contact with a hazard would be minor, only needing first aid and not requiring hospitalization.

Guarding Factor

The guarding factor is determined by the level of safeguarding already in place to protect workers from a hazard. Using our method of calculation, the guarding factor can be assigned either a 0.1, 0.2, 0.3, 0.6, or 0.9 based on the following variables:

- .01 - There is no guarding in place, or the existing guards are so bad that they may as well not be there.
- 0.2 - There is an existing guard, but there are large gaps or openings allowing access, such as U-shaped coupling guards.
- 0.3 - There is an existing guard, but there are small gaps or openings allowing some access, such as an exposed shaft.
- 0.6 - There is an existing guard with minor issues, such as "tool to remove".
- 0.9 - The existing guards have no issues and are all good.

GUARDING RISK MATRIX

Method of Calculation

Once equipment has been assessed and values have been assigned to probability, severity, and the guarding factor, the overall risk rating can be calculated. Belt Conveyor Guarding uses the following formula to calculate total risk:

$$\frac{\text{Probability x Severity}}{\text{Guarding Factor}} = \text{Risk}$$

OVERALL RISK = $\frac{P \times S}{G}$		GUARDING FACTOR				
		0.1	0.2	0.3	0.6	0.9
PROBABILITY OF INJURY (P) X INJURY SEVERITY (S)	16	160	80	53	26	18
	12	120	60	40	20	13
	8	80	40	26	13	9
	6	60	30	20	10	6
	4	40	20	13	6	4

Overall risk score range: 4-18. Risk is acceptable and no further action is necessary.

Overall risk score range: 20-26. Additional controls should be considered to bring machine risks into an acceptable range.

Overall risk score range: 40-160. Risk is unacceptable. Guarding needs to be designed and implemented to bring risks into an acceptable range.

This method of calculation is derived from an article of Paul A Zoubek in the November 2013 issue of *The Synergist, Machine Safeguarding Risk Assessment - Achieving Acceptable Risk.*