



TECHNICAL REPORT 5045

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Continuous mechanical handling equipment -- Safety code for belt conveyors -- Examples for guarding of nip points

Engins de manutention continue -- Code de sécurité des transporteurs à courroie -- Exemples de protection aux points d'enroulement

Technical Report 5045 was drawn up by Technical Committee ISO/TC 101, *Continuous mechanical handling equipment*, and approved by the majority of its members. The reasons which led to the publication of this document in the form of a Technical Report are given below.

The aim of this Technical Report is to give examples for safety at nip points between belts and pulleys and between belts and idlers for all belt conveyors.

This Technical Report incorporates sketches which show in principle how sufficient safety can be achieved, without excluding other methods which give the same safety factor. As this is a subject that cannot be considered as suitable for an International Standard, it was decided to publish the document as a Technical Report.

1 SCOPE AND FIELD OF APPLICATION

This Technical Report describes safety techniques for guarding the dangerous nip points of belt conveyors, which occur between the belt and its pulleys or idlers.

It supplements the various International Standards dealing with safety of continuous mechanical handling equipment. (See, in particular ISO 1819 and ISO 1821. Nomenclature of equipment is given in ISO 2148.)

2 REFERENCES

ISO 1819, *Continuous mechanical handling equipment -- Safety code -- General rules*.

ISO 1821, *Continuous mechanical handling equipment for loose bulk materials -- Belt feeders and conveyors -- Safety code*.

ISO 2148, *Continuous handling equipment -- Nomenclature*.

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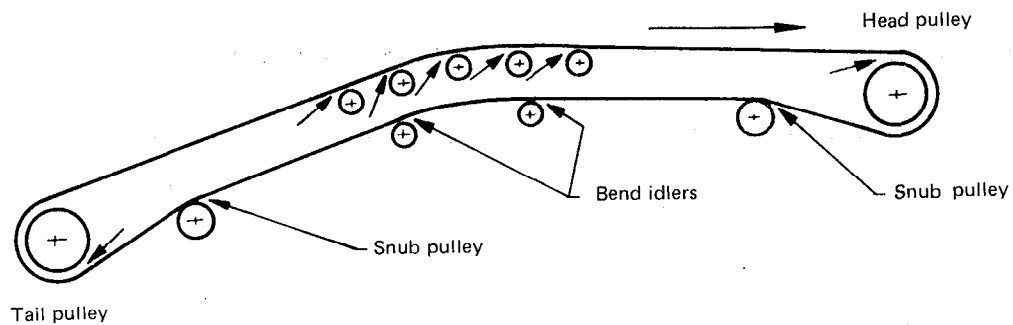
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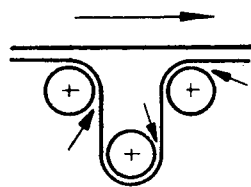
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3 DANGEROUS NIP POINTS

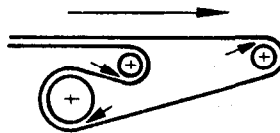
3.1 The most dangerous nip points on belt conveyors occur when the belt is reversed or deflected. Typical examples are shown in the following illustration.



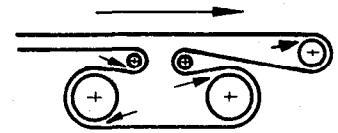
3.2 When there are additional reversal or deflection points on individual sections of the conveyor, the nip points to be guarded are typically as shown below.



Gravity tension gear

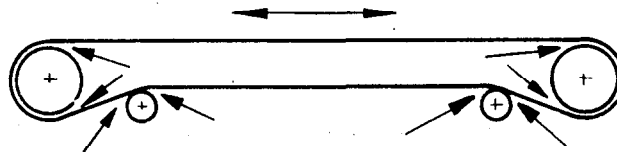


Extended throw-off



Double pulley drive

3.3 Reversible belts have additional danger points, namely, the in-running nips which were previously run-off points of the pulleys; these points are shown in the illustration below.



4 SAFETY MEASURES FOR BELT PULLEYS

Intakes between the belt and pulley are very dangerous, owing to the considerable forces exerted, and the arc of contact of the belt of 180° or more. Operating conditions, and the method of tensioning, must be taken into account when designing guards, which should prevent all access to the intake.

4.1 Direct safety measures for the nip point

If the type of material conveyed permits, it is preferable to insert devices at the danger point, since the devices protect the danger point directly. They also permit good visual inspection during operation and need not be removed during repair and maintenance work.

Complete protection is given only when the leading edge is carefully designed, undeformable, and entered as deeply as possible into the nip point.

Guards of solid section may not be used with rod or mesh belts where the mesh aperture or the rod spacing exceeds 10 mm, nor may they be used with bar or cage pulleys in reversible conveyors. For non-reversible conveyors, such solid section guards made from formed sheet as in 4.1.2 are suitable for use with bar or cage pulleys (see also 4.4.2).