



Continuous mechanical handling equipment — Safety code for belt conveyors — Examples for protection of pinch points on idlers

Engins de manutention continue — Code de sécurité des transporteurs à courroie — Exemples de protection des points de coincement sur les rouleaux

Foreword

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The main task of ISO technical committees is to prepare International Standards. In exceptional circumstances a technical committee may propose the publication of a technical report of one of the following types :

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- type 2, when the subject is still under technical development requiring wider exposure;
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Technical reports are accepted for publication directly by ISO Council. Technical reports types 1 and 2 are subject to review within three years of publication, to decide if they can be transformed into International Standards. Technical reports type 3 do not necessarily have to be reviewed until the data they provide is considered no longer valid or useful.

ISO/TR 8435 was prepared by Technical Committee ISO/TC 101, *Continuous mechanical handling equipment*.

The reasons which led to the decision to publish this document in the form of a technical report type 3 are explained in the Introduction.

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0 Introduction

This Technical Report supplements the various safety standards for conveyors for loose bulk materials and unit loads. It gives examples of the many kinds of hazards connected with belt conveyors at pinch points on idlers. This Technical Report incorporates illustrative examples which show in principle how sufficient safety can be achieved, without excluding other methods which give the same level of safety. As this is a subject that cannot be considered as suitable for publication as an International Standard, it was decided to publish the document as a technical report.

1 Scope and field of application

This Technical Report gives examples of the kinds of hazards connected with running belts between idlers and fixed parts of belt conveyors and also between the idlers themselves.

It describes different safety devices which will achieve acceptable safety levels for the operation of this type of continuous mechanical handling equipment (in accordance with the nomenclature given in ISO 2148).

This Technical Report supplements International Standards ISO 1819 and ISO 7149 and Technical Report ISO/TR 5045, all of which deal with safety issues.

2 References

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

ISO 2148, *Continuous handling equipment — Nomenclature*.

ISO/TR 5045, *Continuous mechanical handling equipment — Safety code for belt conveyors — Examples for guarding of nip points*.

ISO 7149, *Continuous handling equipment — Safety code — Special rules*.

3 Danger points

The risk of crushing occurs at any points where, in the event of the hands getting caught, the belt does not have a clearance f (see figure 1 and succeeding figures) of at least 50 mm or does not yield to produce a clearance of the same size.

NOTE — This lower limit of 50 mm for the clearance f ensures that a hand caught in the gap will only be pulled in by a weak force, so that it can always be pulled out. However, clearance f should never have a value between 70 mm and 120 mm, because then larger parts of the body (for example a fist or an arm) may be pulled in. Between 50 mm and 70 mm the geometrical relations prevent these limbs from being caught; clearances of more than 120 mm mean that they can be pulled out without trouble.

All these dimensions are only valid for belt conveyors with speeds up to approximately 3 m/s, because additional dynamic effects occur at higher speeds.

Danger points of this kind exist, for instance, in the following places.

3.1 Feed hoppers

At points where the flexible packing strips of feed hoppers placed on top of the belt do not allow the required clearance f of the belt above the idler, when the hopper is loaded (see figure 1).

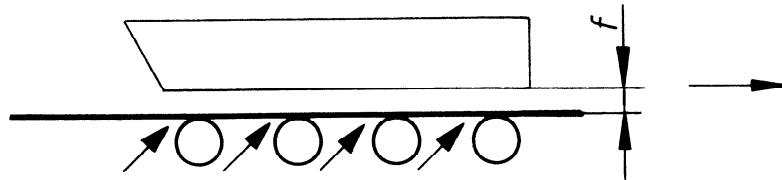


Figure 1

3.2 Skirt plates

At points where the skirt plates or the flexible packing strips do not allow the required clearance f of the belt above the idler (see figure 2).

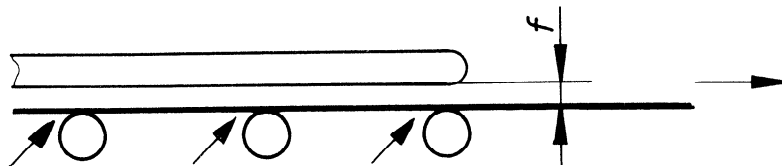


Figure 2

3.3 Bracing above idlers

At points where, in the return belt zone, the required clearance f is not maintained between the belt above the idlers and the longitudinal or cross-bracing of the structure above them (see figure 3).

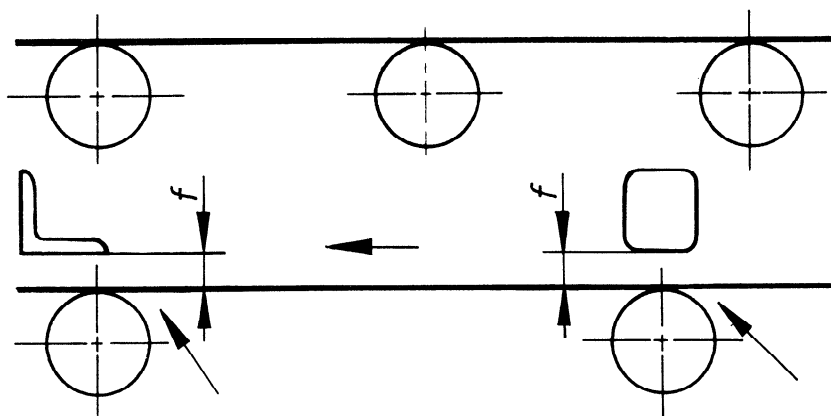


Figure 3

3.4 Between idlers

At points where clearance f is not maintained between the belt above the return idlers and the carrying idlers arranged above them (see figure 4).

Since, in this case, a trapping point also occurs between the two moving surfaces inside the conveyor structure, the clearances laid down above shall be respected, if the trapping point can be reached.

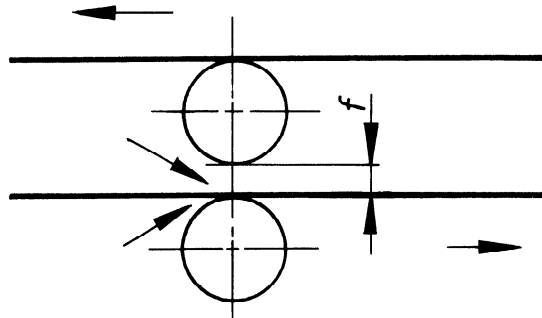


Figure 4

3.5 Between idlers and a fixed surface

At points where clearance f between the belt above the idler and the bottom of a fixed surface is not maintained in the idler zone (see figure 5).

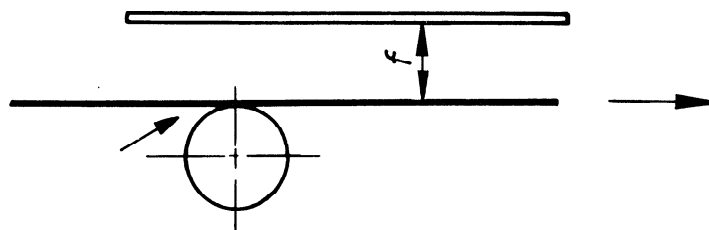


Figure 5

4 Safeguards

This clause gives examples of methods for achieving the required clearance f in certain circumstances. It should always be checked in the first instance whether the design allows clearance f to be maintained.

Should clearance f not be maintained, examples of satisfactory safeguards are illustrated.

4.1 Feed hoppers

4.1.1 Protection using a sloping arrangement of the skirt plates and flexible sealing strip

For hand-fed conveyors or conveyors designed to carry light material, a sloping arrangement of the skirt plates combined with a sufficiently wide flexible sealing strip is suitable. The flexible sealing strip shall lie relatively flat against the belt and, by design and when under the load of the material conveyed, it shall yield to produce clearance f (see figure 6).

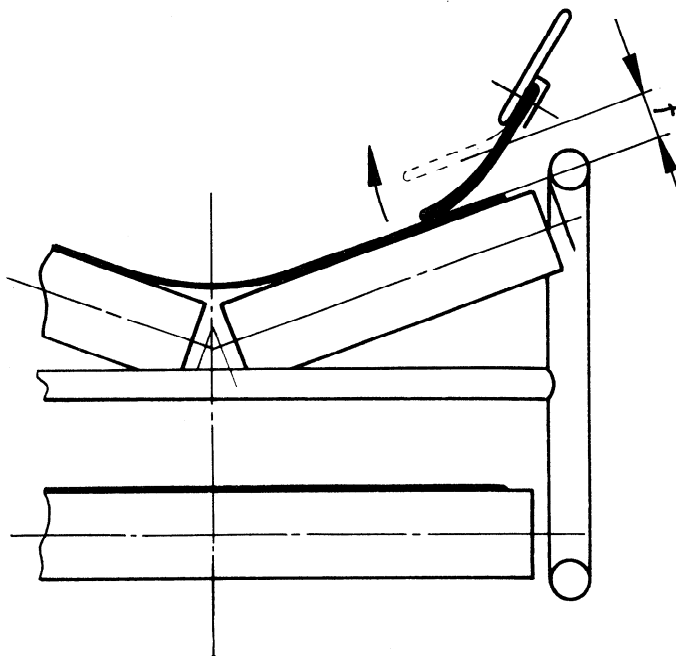


Figure 6

4.1.2 Side-guards to guard carrying idlers in the hopper zone when the clearance f is not maintained

4.1.2.1 Full side-guards extending down to the bottom of the supporting structure are possible on light mobile conveyors (see figure 7), especially if fed by hand.

If these conveyors are moved regularly, this will avoid build-up of material.

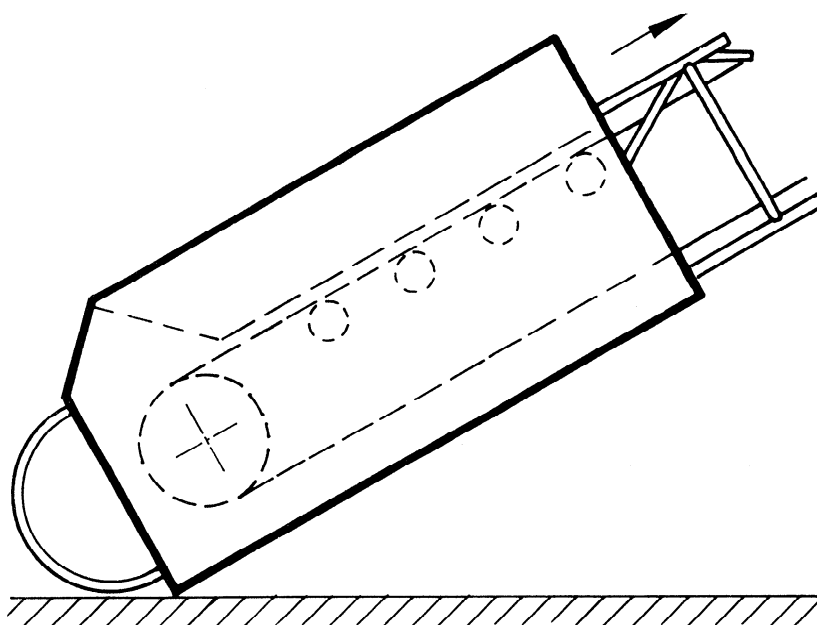


Figure 7