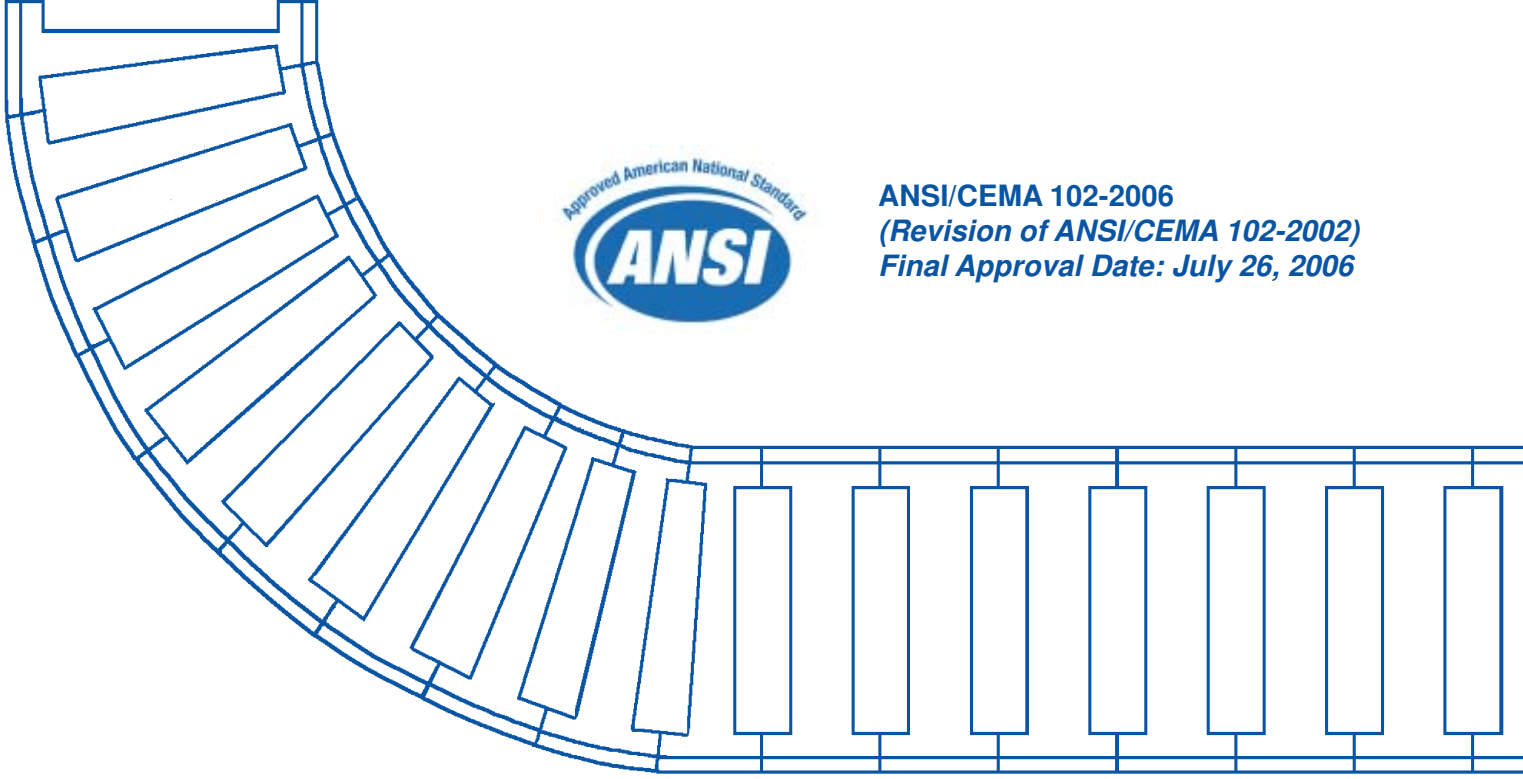


ANSI/CEMA 102-2006
(Revision of ANSI/CEMA 102-2002)
Final Approval Date: July 26, 2006

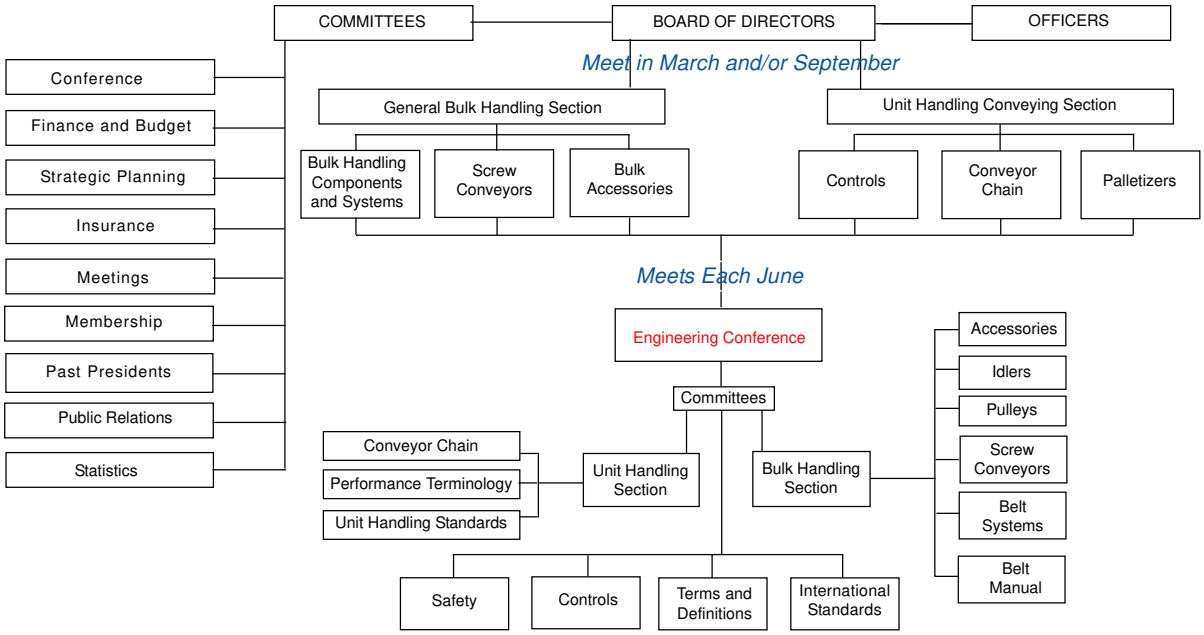
CONVEYOR

Terms and Definitions

CEMA No. 102-2006

Conveyor Equipment Manufacturers Association

CEMA ORGANIZATIONAL CHART



For Information on Company Membership
visit the CEMA Web Site at
http://www.cemanet.org

SAFETY NOTICE

The Conveyor Equipment Manufacturers Association has developed Industry Standard Safety Labels for use on the conveying equipment of its member companies.

The purpose of the labels is to identify common and uncommon hazards, conditions, and unsafe practices which can injure, or cause the death of, the unwary or inattentive person who is working at or around conveying equipment.

The labels are available for sale to member companies and non-member companies.

A full description of the labels, their purpose, and guidelines on where to place the labels on typical equipment, has been published in CEMA's *Safety Label Brochure*, Brochure No. 201. The Brochure is available for purchase by members and non-members of the Association. Safety Labels and Safety Label Placement Guidelines, originally published in the Brochure, are also available free on the CEMA Web Site at http://www.cemanet.org/CEMA_Safety_Pg.htm

PLEASE NOTE: Should any of the safety labels supplied by the equipment manufacturer become unreadable for any reason, the equipment USER is then responsible for replacement and location of these safety labels.

Replacement labels and placement guidelines can be obtained by contacting your equipment supplier or CEMA.

CONVEYOR TERMS AND DEFINITIONS

DISCLAIMER

The information provided in this document is advisory only. These recommendations are provided by CEMA in the interest of promoting safety in the work place.

These recommendations are general in nature and are not intended as a substitute for a thorough safety program. Users should seek the advise, supervision or consultation of qualified engineers or other safety professionals.

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CEMA No. 102-2006

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Foreword and Acknowledgments

This, the eighth (2006) edition of the industry dictionary, CONVEYOR TERMS AND DEFINITIONS revises the seventh edition of ANSI-CEMA 102-2002.

The first edition was a successful attempt by the members of the Conveyor Equipment Manufacturers Association (CEMA) to introduce order into varying terminology and definitions as an aid to users of conveyor equipment and systems, to manufacturers, educators and the many others whose work or interests may bring them in contact with material handling equipment.

In due course, this dictionary was approved as an "American National Standard" under the voluntary standards procedure of the American National Standards Institute in 1956, and has been reaffirmed or revised regularly since then.

This standard of nomenclature and definition has been adopted by conveyor manufacturers in the United States, Canada, and in many countries of the world. It has found a place in the U.S. information libraries throughout the world and in the offices of many embassies and consulates of the United States.

Throughout the book, an effort has been made to define a conveyor or related equipment by what it "is" rather than what it "does." Preferred terms are followed by their definitions. Other terms in common use are listed, but cross-indexed back to the preferred term in each case. Trade names have been avoided in all instances except those where long established use by the public has given them the status of common property.

The illustrations throughout this book are schematic in nature and represent the general nature of a particular device. *The illustrations are not intended to represent the recommended safety standards, as guarding has been omitted for clarity of the operational characteristics of the device. Refer to the current editions of American National Standards ASME/ANSI B20.1, "Safety Standard for Conveyors and Related Equipment; ANSI/ASME B 15.1, "Safety Standard for Mechanical Power Transmission Apparatus"; and ANSI Z244.1, "Safety Requirements for the Lockout/Tagout of Energy Sources."*

Many technical and engineering terms commonly used in the conveyor industry have been included with the recognition that these same terms may be used extensively by other groups. This edition reflects the interrelationship between the machines of materials movement and processing machinery to a point where the dividing line between the two becomes almost indistinguishable at times; and the trend of the "systems" approach to planning conveyor design and application.

The Conveyor Equipment Manufacturers Association gives its special thanks to the engineers of the member companies and to the other interested members of the conveying community who gave freely of their own time over the years in a dedicated effort to make this publication as complete and accurate as possible at any given time and, all the while, realizing that such a book can never be completed since it is a part of a dynamic and expanding culture.

Eighth Edition - Summary of Changes

As with any standard, the Eighth Edition of CEMA's Conveyor Terms and Definitions contains normative and non-normative sections. Normative items are part of the standard. Non-normative items are informational. (Introduction, Foreword, and Appendixes).

The Normative portion of this Standard contains 77 new terms and 10 modified terms and definitions when compared to the Seventh Edition. (See list on page iv)

The Two Column format has been replaced with a Single Line Entry format to facilitate viewing and searching in PDF and other electronic viewing modes.

Graphics associated with a term or definition have been placed, dictionary style, in a column to the right on the same page as the entry.

Additionally, the Eighth Edition contains Four Non-Normative Appendixes that contain specialized sets of terms and definitions that CEMA has previously published as either CEMA Standards or Pamphlets.

They are included in this edition to capture them in one place as a service to the conveying industry. It is hoped that users will provide CEMA suggested modifications or changes to these definitions over the life of the Eighth Edition. It is CEMA's intention to then include some or all of them as part of the normative section of the standard in the Ninth Edition.

LIST OF APPENDIXES

1. Palletizer Terms and Definitions
2. Pneumatic Conveying Terms and Definitions
3. Vibrating Equipment Terms and Definitions
4. Conveyor Electrical Terms and Definitions

Prepared and Coordinated by the

CONVEYOR TERMS AND DEFINITIONS COMMITTEE
of the
CEMA ENGINEERING CONFERENCE

Standard No. 102-2006 - Copyright 2006

EIGHTH EDITION

NEW TERMS AND DEFINITIONS IN EIGHTH EDITION

NOTE: All of these terms and definitions will be in this color in the normative pages for ease of identification.

Angle of slide
Automated electric monorail
Automatic electrical monorail

Beaver tail
Bias banking
Blocked chute detector

Carrier
Carrier chain conveyor
Center drive
Chute plugging safety switch
Conveyor accessory
Cross belt sorter

Diagonal banking
Diverge switch

Electrical conveyor accessories
End drive
Entrance switch
Exit switch

Free track
Front trolley

Gapping conveyor

Hockey puck

Impact cradle
Inbound idler
Indexing conveyor
Induction conveyor
Insert section
Intermediate trolley

King pin

Leading trolley
Line full sensing
Load bar
Load bar axle
Load pin
Load sharing conveyor
Load switch
Loading zone

Magnetic detector
Material discharge plow
Merge switch
Metal bar code
Metering conveyor
Misalignment switch
Motor brake

Normal track

Open track
Outbound idler

Parasitic drive
Plugged chute detector
Pork chop
Positioner
Pre-start alarm
Production rate conveyor
Push across transfer
Pusher drive

Quick rise

Rear trolley
Retractable
Return belt plow

Singulator
Ski bar
Skirtboard system
Slider bed
Standard track
Stop
Stop blade
Surge
Suspended tramp iron removal magnet
Switch blade

Tandem banking
Tight bite track
Tongue
Track drop
Trailing trolley
Tramp metal detector
Transition distance
Transition idler

REVISIED TERMS AND DEFINITIONS IN EIGHTH EDITION

Automated monorail system

Backstop
Belt cleaner
Belt plow
Belt tear or rip detector

Carousel conveyor

Flat-top chain
Flat-top conveyor

Impact bed

Zero speed switch

A

Acceptance - acknowledgment by the purchaser (or user) that equipment or services provided are suitable for accommodating the intended function.

Accessibility - the ease of access or approach to equipment for operation, inspection, maintenance, and lubrication.

Accumulating bumper - a bumper on a power-and-free conveyor carrier or in-floor tow conveyor cart which incorporates a control mechanism to disengage the carrier or cart from the powering means. Disengagement occurs when the bumper contacts a fixed object. The powering means is automatically re-engaged when the object is removed.

Accumulation conveyor - any conveyor designed to permit accumulation of packages, objects, or carriers. May be roller, live roller, roller slat, belt, vibrating, power-and-free, or tow conveyors. See Minimum pressure accumulation conveyor and Zero pressure accumulation conveyor.

Accumulating track - the section of track where the vertical dimension between the power track and the free track is great enough to allow the retractable dog on the accumulating (lead) trolley to drop low enough to disengage from the power chain dog when the end of the operating lever rides up on the "beaver tail" of the preceding trolley.

Accumulating trolley - a free trolley with a retractable dog and a holdback dog which are capable of being disengaged from the power chain dog.

Adjustable rate vibrating feeder - a vibrating feeder in which the material flow rate within a specific range can be changed while the feeder is operating. See Fixed rate vibrating feeder.

Adjustable speed drive - a drive or power transmission mechanism that incorporates a device that permits control of its speed within design limits.

A-frame - a support frame with main members set on slopes suggesting the letter "A."

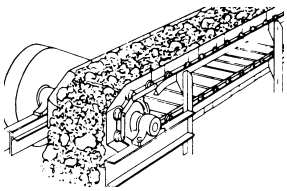
Air conveyor - base blow - a fixture which uses pressurized air to move materials or products (typically, empty containers) from one place to another, in a continuous or intermittent flow. Products ride upon a cushion of air whose flow is directed through holes in the surface of an air plenum. A typical application is the conveyance of empty PET bottles.

NOTE: PET = polyethylene terephthalate resin which is the "plastic" typically used to make bottles that are used for water, beverages, and other liquids.

Air conveyor - top blow - a fixture that uses pressurized air to move products (especially empty PET bottles) from one place to another, in a continuous or intermittent flow. Typically, PET bottles are suspended by the neck ring (a protrusion below the bottle mouth), and they glide along opposing neck guides, propelled by directed air flow. Several design variations have been successfully employed for a variety of applications (e.g., blowing from one side only, blowing on both sides of the container, blowing on the top or shoulder of the container, blowing a narrow jet against the neck ring only, etc.).

Air cushion - the effect of localized high-pressure areas generated by the controlled escape of air from the conveying chamber (plenum) of air conveyor.

Air dam - a device placed within the conveying chamber (plenum) of air conveyor to direct the flow of air for a specific directional change in the flow of product (containers).



Air-float chain conveyor

Air-float chain conveyor - chain and roller conveyor in which the chain is supported by an inflatable air hose to control and minimize line pressure.

Air-lock - (l) a term which, when applied to gates or valves, indicates tightness of closure to prevent the movement of air as well as bulk materials. (2) When applied to feeders, indicates ability to transfer bulk materials without presenting an open passage that would allow free flow of air.

Air lock bin valve - a type of valve used to control free-flowing materials which may have become aerated. The flow of material is interrupted at two points and provides an air chamber between the two seals when closed.

Air slide - a chute or spout into which air is introduced through the sliding surface to facilitate movement of bulk material down a slight decline.

Air track - a single-file type of air conveyor with accessory air flow (such as an added top-blow plenum) suitable for infeeding container-handling machinery, e.g., in the can manufacturing industry.

Aisle transfer car - a machine or vehicle for transferring a storage/retrieval (S/R) machine from aisle to aisle, which also normally runs on a rail or rails.

Alignment - the position of parts, or components, in relation to each other.

A**lpine** - a tiered incline conveyor, typically single-file, which functions as a first-in/first-out (unidirectional) accumulator. It may also be used as a lift or a lowerator. Also called Alpine accumulator.

Amplitude - the distance from the mean position to the point of maximum displacement. In the case of a vibrating screen or vibrating conveyor with circular motion, amplitude would be the radius of the circle. In the case of straight-line or elliptical motion, it would be one-half of the major axis of the ellipse, or one-half of the stroke.

Anchor bolts - bolts used for fastening the conveyor to the floor, pit, or other foundation, or to ceiling or overhead structure when the conveyor is suspended.

Angle of attack - see Stroke angle.

Angle of inclination - the angle a conveyor is inclined from the horizontal. See also Maximum angle of inclination.

Angle of repose - the angle which the surface of a freely formed pile of bulk material makes to the horizontal.

Angle of slide - that minimum angle to the horizontal of an inclined flat surface on which an amount of material will slide downward due to its own weight.

Angle of surcharge - the angle to the horizontal which the surface of the material assumes while the material is at rest on a moving conveyor belt. This angle usually is 5 to 15 degrees than the angle of repose, though in some materials it may be as much as 20 degrees or less.

Antibackup - see Backstop.

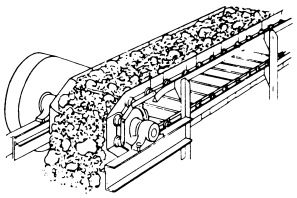
Antifriction bearing - a bearing using rolling elements such as balls, rollers, or needles.

Anti-runway - a safety device to prevent uncontrolled movement of a loaded incline or decline conveyor or carriers in the event of mechanical or electrical failure.

Antislip surface - any surface specially treated or prepared to give greater than normal traction.

Approval - the concurrence or acceptance which ratifies or confirms an existing understanding as to the terms, construction, methods of operation, or other terms.

Apron - a series of pans or plates attached to chain or pivotally attached to one another to form the conveying medium of a conveyor.



Apron conveyor

Apron conveyor - a conveyor in which a series of apron pans form the moving bed.

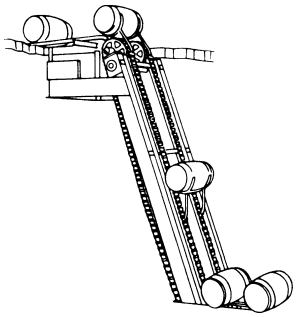
Apron feeder - see Feeder.

Apron pan - one of a series of overlapping or interlocking plates or shapes which, together with others, form the conveyor bed. See Hinged apron pan.
Apron pan, double beaded - see Double beaded apron pan.

Apron pan end - a plate which is attached or formed at each end of the apron pan normal to the carrying surface to prevent spillage.

Apron pan, wood-filled - see Wood-filled apron pan.

Archimedes conveyor - see Internal ribbon conveyor.



Arm conveyor

Arching - the bridging of material above an opening whereby flow ceases.

Arc of contact - the angular wrap in degrees of a belt around a pulley.

Arm conveyor - a conveyor consisting of an endless belt of one or more chains to which are attached projecting arms, or shelves, for handling packages or objects in a vertical or inclined path.

Armored apron - an apron in which each pan is provided with a separate wearing plate.

Armored belt - a conveyor belt which has been protected with metal strips to prevent gouging or tearing of the cover by sharp objects being handled.

Assembly conveyor - any type of conveyor adapted to convey assemblies or parts through a series of progressive assembly operations.

Auger - see Conveyor screw.

Automated electrified monorail (AEM) - see Automated monorail system (AMS)

Automated guided vehicle - a vehicle designed to follow a predetermined path consisting of a painted line, tape, electromagnetic field of a conductor, or other guidance system without requiring the attention of a driver. The vehicle may be remote controlled or automatic in operation. See also Driverless tractor train.

Automated monorail system (AMS) - a single rail conveyor system on which each carrier is equipped with an on-board controller and electric drive unit.

Automated storage/retrieval systems (AS/RS) - a combination of equipment and controls which handles, stores, and retrieves materials with precision, accuracy, and speed under a defined degree of automation.

Automatic - self-acting and/or self-regulating mechanism that performs a predetermined function. The term automatic is frequently misused to imply some degree of control sophistication or automation. Specific description of the intended automatic function is necessary for a proper understanding.

Automatic belt tripper - a belt-propelled or motor driven device having automatically controlled forward and reverse traversing movement between established limiting points for diverting materials or objects from the conveyor.

Automatic dispatch control - a system used to direct a unit load and/or conveyor carrier to a predetermined destination without operator attention.

Automatic electrified monorail (AEM) - see Automated monorail system (AMS)

Automatic lubricator - a device used to lubricate the chain, trolley wheels, or other conveyor components automatically.

Automatic take-up - a take-up having provisions which permit it to automatically compensate for stretch, shrink or wear of belts, cables, chains, etc., and to maintain proper tensions. See Take-up.

Automated monorail system (AMS) - a single rail conveyor system on which each carrier is equipped with an on-board controller and electric drive unit. Also called Automated or Automatic electrified monorail (AEM)

Average capacity - the capacity rate arithmetically averaged over a relatively long specified period of time. For example, the number of tons delivered in an eight-hour shift divided by eight, or the number of tons delivered in a full day divided by 24. Also can be specified in cubic feet per unit of time.

Axial vane damper - a device used to adjust air pressure in a blower zone by controlling the amount of air allowed to pass through the blower. Either operated manually or automatically. (So named because its blades or "vanes" are evenly and radially arranged about a central axis.)

Axle - a shaft, either rotating or non-rotating, on which are mounted drive, driven, or supporting wheels or rollers.

B

Back end (Vibrating equipment) - see Feed end.

Back charge - any charge to a vendor arising from unanticipated labor and/or material costs as a result of claimed or alleged nonperformance.

Backing - (l) in pillow blocks, motors, speed reducers, and other like devices, the distance from the center of the shaft to the mounting surface; (2) in miter or bevel gears, the distance from the pitch circle plane to the face of the hub on the side opposite the teeth; (3) in belt idlers, the distance from the top of the horizontal roll to the mounting surface.

Back legging - the term applied to material elevated in a bucket elevator, en masse conveyors, and similar equipment, which does not discharge when the conveying medium reaches the discharge spout and which falls into the return section.

Backstop - a mechanical accessory that allows a conveyor to operate only in one direction. Backstops are used on inclined conveyors, bucket elevators, sandwich belt conveyors, pocket belt conveyors, skips, etc. Often called a Holdback.

Backup bar - a metal bar used to back up the chain of a caterpillar drive to hold the drive chain dogs in proper contact with the conveyor chain.

Backup rollers - a series of rollers so mounted as to back up the conveyor chain to hold it in proper relation to the caterpillar chain dogs.

Baffle - see Deflector.

Bag elevator - see Arm conveyor.

Bagging scale - any scale especially designed or adapted for weighing materials during a bagging operation.

Bail - a yoke or pivoted frame designed to span a conveyor frame or skip bucket and provide a single point of support.

Balanced and isolated vibrating conveyor - balanced vibrating conveyor which is mounted on springs to further reduce the transmitted dynamic forces.

Balanced drive - a drive so designed that two or more drive units on a single conveyor may be synchronized to pull predetermined shares of the load.

Balanced vibrating conveyor - any vibrating conveyor designed to reduce the transmitted dynamic forces to the supporting structure.

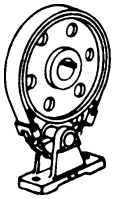
Ball bearing, end thrust - see End thrust bearing.

Ball table - a group of ball transfers over which flat surfaced objects may be moved in any direction.

Ball table

Ball transfer - a device in which a larger ball is mounted and retained on a hemispherical face of smaller balls.

Band brake backstop - a type of backstop consisting of a wheel and a brake band. The two ends of the band are attached to a cam linkage in such a way that the friction between the brake wheel and the band actuates the linkage to increase the perimeter of the band when operating in the forward direction and to decrease the perimeter in the reverse direction. The brake band grips the wheel to prevent reverse rotation.



Band brake backstop

Bar flight conveyor - see Drag chain conveyor; Flight conveyor.