



Belt Conveyor Design

Engineering, component selection, installation and maintenance — how a belt conveyor actually behaves, and the judgment experienced conveyor people build over a career, in three days in Golden, Colorado.

Belt Conveyor Design, Green Center, Colorado School of Mines

Why this course exists

A belt conveyor is a complex electromechanical system, and most of the people who design, buy and maintain them learned it from the person at the next desk. This course is about actually doing the work: designing, selecting and building the components; installing and servicing the belt; figuring out what is not working, understanding why, and getting it fixed — from boots on the ground and time spent in the field and the factory, not just behind a desk. **It covers a global market, not only the USA**, and the technologies now changing the work: monitoring, digital twins, and artificial intelligence. Every attendee leaves with their own copy of CEMA's *Belt Conveyors for Bulk Materials*, 7th Edition.

Who it is for

Engineers who own the system

Project, design and mining engineers taking on full-system responsibility; component engineers moving from one subsystem to whole-system thinking; anyone who writes the specification and has to defend it.

Operations and maintenance

Mine, mill and plant managers, maintenance and reliability staff, field service and splice supervisors — the people who keep it running and change the belt.

Suppliers and manufacturers

Product managers and sales engineers for belting, idlers, pulleys and drives who need the whole system to talk credibly about their part of it.

What you leave with

- **The tension diagram as the one tool.** Visualising the tensions around the system, where the power goes, CEMA against DIN — and the economics that decide between a conveyor, a truck and a train: CAPEX, OPEX, NPV, energy, belt life.
- **USA versus the rest of the world.** Why the same conveyor is specified differently on either side of the Atlantic — Renard numbers, locking assemblies against hub-and-bushing, roller against idler-set ratings, breaking against operating strength.
- **Belting decided properly.** Carcass and cover selection, low rolling resistance rubber and how it is really tested, modulus and permanent elongation, take-up movement, transition distances.
- **Steel cord from the factory to the splice.** How the belt is made, strengths to ST 10,000, cord tables and minimum pulley diameters, splice patterns from one step to five, knifeless preparation and laser layout, magnetic flux leakage scanning, X-ray, and rip detection.
- **Idlers and pulleys as engineered components.** What CEMA B through E actually promise and what manufacturers deliver; pulley loads, the shell, shaft and end-disk lineage from Sitzwohl and Lange to FEA, and why modern locking assemblies change the answer.
- **Installation, repair and replacement done safely.** Lockout/tagout; presses, winders, clamps and brakes; planning a changeout in Google Earth Pro and Navisworks; the one calculation every splicer needs.
- **Belt tracking and route planning.** The systems that are genuinely hard to track and the take-up as the usual cause; route optimisation, vertical and horizontal curves, life-cycle cost.
- **Digital twins and AI on a real conveyor.** The data, the calibration, using the twin; a machine-learning approach to power anomaly detection; the CEMA method from the 7th edition to the 8th.
- **Transfer points and special applications.** Discrete element modelling and the chute upgrade steps; pipe belts, air-supported, high-angle and flying conveyors.
- **Your own copy of the Belt Book.** CEMA's *Belt Conveyors for Bulk Materials*, 7th Edition, provided to every attendee, with the course notes and reference documents behind each session.

The three days

WEDNESDAY 14 OCT

Systems, Tensions, and Belting

- Objectives; the technologies moving fastest
- USA vs the rest of the world; associations vs standards
- Design fundamentals: components, tension diagrams, **CEMA vs DIN**, the software
- Conveyor economics: CAPEX, OPEX, NPV
- Belting: covers, LRR rubber, rating, modulus, take-up, transitions
- Steel cord: manufacturing, design, splicing, scanning, rip detection

THURSDAY 15 OCT

Idlers, Pulleys, Drives, and Dynamics

- Fabric belts, turnovers, vertical curves
- Idlers: anatomy, ratings, **CEMA B–E**, manufacturing, seals, structure, monitoring
- Pulleys: loads, shell, shaft, end disk, locking assembly, FEA, lagging
- Drives: VVVF, gearless, motorised pulleys
- Dynamic considerations: starting and stopping

FRIDAY 16 OCT

Installation, Monitoring, Transfer Points

- Installation, repair and replacement: safety, equipment, planning
- Belt tracking; route planning and life-cycle cost
- Monitoring, digital twins and AI; **CEMA 8th ed.**
- Transfer point design with DEM
- Special applications; open discussion 14:00–15:00

The instructor

Andrew Hustrulid, PhD, PE

Involved in belt conveyor design, engineering, manufacturing and troubleshooting since his BSc from Colorado School of Mines in 1992, with an MSc and PhD from Mines and a career across belting, idlers, pulleys, system design, installation and splicing on four continents. Vice chair of the CEMA pulley committee and past chair of the CEMA Advanced Technologies committee responsible for the Belt Book. Founder of Hustrulid Technologies and author of Conveyor Maven, Pulley Maven and Chute Maven.

Content questions: andrew@hustrulid.com

Software in the room

This is a conveyor class, not a software class. But bring the tools you use every day, whichever you run — underneath they share the same method, and the method is what the course teaches. Andrew will be sharing the latest software he has developed, including Conveyor Maven, and Friday runs a calibrated digital twin of a real conveyor and a machine-learning model that flags power anomalies before they become failures.

Format

WHERE

Green Center, Room 224, Colorado School of Mines, Golden, Colorado.

WHEN

Wed 14 – Fri 16 October 2026.
08:00–17:00 Wed and Thu;
08:00–15:00 Fri, last hour open discussion. Check-in 07:30 Wednesday.

REGISTRATION

\$2,200 through 14 September;
\$2,400 after. Register at proed.mines.edu/courses/bcd.

INCLUDED

Tuition; your copy of CEMA *Belt Conveyors for Bulk Materials*, 7th Edition; course notes and reference documents; breakfast, breaks and lunch each day.

LANGUAGE

English.

Register through Mines ProEd

proed.mines.edu/courses/bcd · Conference and Event Services: learn@mines.edu · 303.384.2690

Course content: andrew@hustrulid.com · www.hustrulid.com ·  [linkedin.com/in/hustrulid](https://www.linkedin.com/in/hustrulid)



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