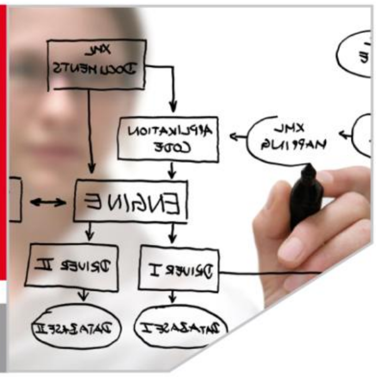
Recent Innovations in Design of Overland Belt Conveyors



Lawrence Nordell - President of Conveyor Dynamics, Inc (CDI)

Mechanical Branch Engineers Australia WA, the Institution of Mechanical Engineers, the American Society of Mechanical Engineers and Australian Society for Bulk Solids Handling

EVENT DETAILS

Date:
Wednesday, 20 March 2013

Time:
11.30am – 2.15pm

Venue:
Auditorium
Engineers Australia
712 Murray Street
West Perth

Cost:
EA & ASBSH members - $15
Non-members - $35

RSVP:
Registration essential by Tuesday, 19 March 2013 via the link below:
https://events.engineersaustralia.org.au/ei/getdemo.ei?id=1657&s=_8VG13QWMA

What are the recent innovations in Australia? Conveyor Dynamics, Inc. (CDI) has enjoyed a long relationship with engineers in Australia since 1987 through 2007. This association has brought many advancements to the conveyor industry such as: 20 km Rio Tinto Channar (1989), 5 km Shell German Creek (1995), 7 km BHP Bi-way (1997), 14 km Westfarmers Muja/Collie (1997), 5 km BHP Yandi (2004) and 20 km Westfarmers Curragh North (2007).

In this session, Lawrence Nordell will offer what Conveyor Dynamics, Inc. (CDI) practices on Overland Conveyors (OLC). The target of the talk will be on what CDI promotes as Optimized Total Life Cycle Cost of Ownership. Among the salient points for both trough and pipe conveyors are:

A. BELT DESIGN

1. Belt Cost Drivers – what is a good belt safety factor, cover gauge and specifications for wear and power; construction techniques that can save on raw material costs not practiced by belt suppliers/engineers

2. Belt Construction Limitations – Idler Junction Pressure Index (IJPI), belt squirm at high pressure point under steel cord and its consequences

3. Belt Specifications – speed, cord construction, cord pitch, splice advancements, belt reels and limits of length/reel

4. Belt Influence on Demand Power – rubber rheology's importance and lack of engineers/users embracing the performance gains – historical measurements and + 2 year Newcastle University testing of idlers and power loss in belt-to-idler contact zone

5. Belt Splice Techniques – definition of belt safety factor (SF), splice pattern advancements and consequences, modern strength limits as dictated by the splice dynamic efficiency; even or odd belt steel cord count. Old and newer practices

6. Belt Life Expectancy – based on Discrete Element Method (DEM) modeling and historical data. How long should an overland belt cover and splice last. An opinion of good and bad practices.

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ENGINEERS AUSTRALIA

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B. IDLER DESIGN

1. Idler Cost Drivers – quantity, quality, diameter, bearing size, spacing.
2. Idler Optimization Techniques: • L-10 Life, spacing & replacement costs • Noise generation vs. spacing – theory & measurements • Return idler trough shape configuration: 3-roll vs 2-roll; single roll • Replacement costs – capital, maintenance • Belt Flap – stringer theory, plate theory, FEM analysis, belt speed
3. Offset vs. In-line trough configuration – benefits of offset for trough and pipe conveyors
4. Idler Pipe Transom & its integration as a structural member and as a belt friendly support – brief discussion on sympathetic vibrations with respect to idler supports.
5. Idler Spacing Limitations – governing conditions include Idler Junction Pressure Index (IJPI), rubber squirm damage at belt cover to idler interface, belt flap and modal vibration avoidance with support structures, trough angle influence; tracking/belt alignment benefits to larger spacing.
6. Idler Ground Modules – types and benefits – stress limits & vibration modes

C. PULLEY ARRANGEMENTS

1. First Axiom – avoid them = minimize their use = best configuration is no more than head & tail pulleys
2. Second Axiom – avoid belt high tension dirty side contact
3. Third Axiom – avoid belt dirty side contact between drives
4. Fourth Axiom - avoid belt dirty side contact
5. Ground vs. Elevated pulley configurations and ultimate cost of operation

D. TAKEUP SYSTEMS

Gravity vs Powered Winch – return tension control – benefits and drawbacks

E. ELEVATED STRUCTURES WITH SELF-POWERED MAINTENANCE TROLLEYS

F. CONTROL METHODS

Brief – speed, tension, torque

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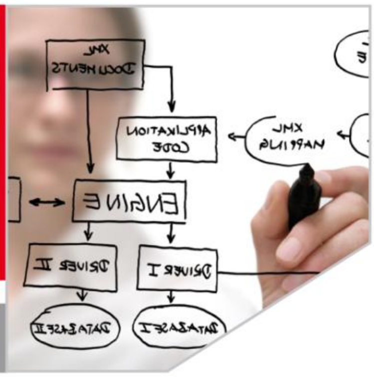

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G. PIPE CONVEYOR DISCUSSION
Who Should Attend - Engineers, engineering students/ graduates, operators and anyone who needs to select, specify, commission, install, operate and/or troubleshoot conveyor equipment.

SCHEDULE

11.30am – 11.55am	Light lunch
11.55am – 12.00pm	Introduction
12.00pm – 14.00pm	Presentation
14.00pm – 14.15pm	Questions/Finish

ABOUT THE SPEAKER

Lawrence Nordell has an excellent international reputation as an authority in the field of bulk solids handling due to his outstanding contribution to research and consulting. He has designed conveyors for 47 years and built the bones of BELTSTAT in 1966, the same year the CEMA belt book was first published. He has published numerous papers and articles. Lawrence Nordell is the President of Conveyor Dynamics, Inc (CDI). For many years, mining, construction, and manufacturing organizations worldwide have trusted CDI to design, model, and improve upon their bulk materials handling systems. Their diverse engineering experience and innovative technologies have made industry leaders in designing efficient, long-lasting and cost-effective heavy industrial equipment.

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