



Idler Selection and Positioning: Extending Belt Life and Avoiding Premature Failures

by Buddy Wilson, Fenner

When building a home or a skyscraper, a solid foundation is required for both immediate and long term stability. This is no different when it comes to supporting a conveyor belt. Conveyor idlers, despite seeming mundane and often an afterthought, are the support system required to achieve the expected service life of any conveyor belt. Unfortunately, idlers are often relegated to the world of MRO purchases, where only a part number, vague description and price point are entertained. Despite the fact that the conveyor systems are the life-blood of all bulk handling operations, little thought is given to the many pitfalls that could come from mixing and matching idler products or to their placement and positioning on the conveyor system.

Idler Overview

As with the conveyor belt manufacturing sector, seemingly just as many idler manufacturers are coming on line to participate in an already crowded market. We are all familiar with the most common brands. However, you may or may not realize, through consolidation and market gaps, there are well over fourteen (14) North American conveyor idler manufacturers and countless foreign products. While most follow CEMA dimensional standards, nearly all have variances in end stand height, center roll height, roll

Idler Specification:

Belt Width:	42"
CEMA Rating Designation:	C
Troughing Angle:	35°
Idler Roll Diameter:	5"
Roll Lengths:	Equal
Roll Material:	Steel

Legend:

A:	Bolt Hole Centers (Mount Width)
B:	Bolt Centers
C:	Overall Length
D:	Overall Footprint
E:	End Stand Height
G:	Individual Roll Length
H:	Belt Width Capacity
K:	Center Roll Height

Brand (s)	A	B	C	D	E	G	H	K
One	51"	7-1/2"	53-1/2"	9-1/2"	18-1/16"	15-7/16"	41-3/4"	9-0"
Two	51"	6-0"	53-0"	10-0"	17-3/16"	15-0"	41-1/16"	8-15/16"
Three	51"	3.25"	53-0"	n/a	16.5"	14.75"	39.75"	8-0"
Four	51"	6.25"	53-0"	10-1/2"	17-3/4"	15-0"	40-9/16"	9-0"
Five	51"	7-1/2"	53-1/2"	9.5"	18-1/16"	15-7/16"	41-3/4"	9-0"
Six	51"	7-1/2"	53-1/2"	9-0"	17-3/4"	14-9/16"	41-1/2"	8-7/16"

Chart A

Continued on page 3



**See the list of Annual Gem Level and
Go for the Gold Scholarship Contributors on page 6**



Bill Hornsby,
2017-18 NIBA President



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Belt Line

Executive Director Michael Battaglia
Graphic Designer Jeanne Rosen

Submissions for inclusion in the *Belt Line* are welcome and may be edited for clarity, space and grammar.

Connect Today!



Letter from the President

Season's greetings from NIBA. With the 2017 Joint Convention now behind us, I'm pleased to see our new Board members, volunteer leaders, committee members and staff maintain their level of commitment and continue to track progress on other important organizational initiatives.

Early next year, Board and committee members will meet in Phoenix, AZ at the Biltmore Hotel. This will be the first opportunity for us to experience the venue for our 2018 NIBA Convention. We've listened to your feedback from the last meeting and have already begun preparations to make this next convention a huge success. We will return to a more traditional NIBA format and implement some improvements.

At the committee level, important work is being done in a number of areas. The Membership Committee is focused on the recruitment of lapsed members, outreach to prospective members and preparation for the next renewal cycle. The Education and Technical Committee is working on a plan to update our organizational training materials and to set the dates for the next series of seminars in April 2018. The Program committee has started preparations for the 2018 Convention, as I mentioned earlier, and will use the time together in AZ to meet with hotel staff and vendors to hammer down more of the logistics. Finally, the Marketing Committee is looking at content strategies and plans for how we can, as an organization, transform our distribution channels to be more compelling.

One important Board initiative that we are undertaking is the development of Key Performance Indicators (KPI). The KPIs will be used as a driver of organizational success moving forward. You may have heard me talk about this initiative during my speech at the Annual Business Meeting in Florida. The theme for this year is "Stabilization." Through a custom dashboard approach for reporting specific leading and lagging metrics, we can communicate with the Board on a monthly basis and determine strategies to fill gaps where we see them and grow the organization.

"A man without a goal is like a ship without a rudder" – Thomas Carlyle

2018 is shaping up to be an important year for NIBA and I'm grateful for the opportunity of serve as your President. I'm looking forward to work more closely with our new staff to stabilize and grow the organization, as well as returning to a more traditional NIBA convention format. Please don't hesitate to reach out at any time to me or the staff, we welcome your feedback and thank you for the support.

Bill Hornsby
NIBA 2017-18 President
Habasit America

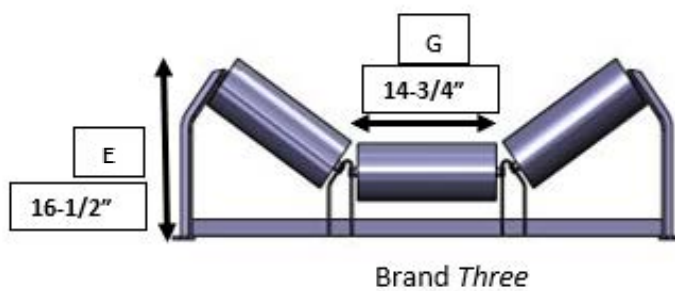
NIBA Members: It's Renewal Time!

All members should be on the lookout for 2018 renewal packets to arrive in early December. Return your completed forms to us via mail, email or fax and we'll confirm receipt.

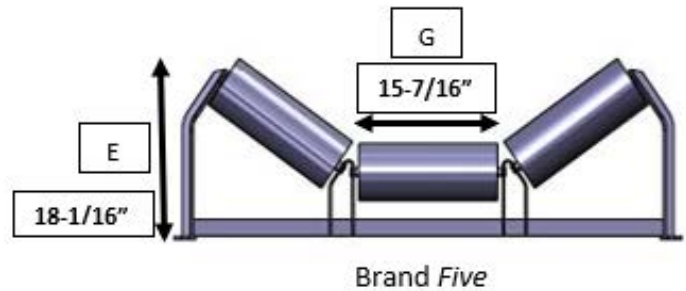
Note: You can review your membership at any time at niba.org. Log-in to your account under "Members" then click the "Renew 2018 Dues" button.

Remember to also include a donation to our Scholarship Fund as part of your renewal. Contributions will go toward your annual Go for the Gold status and Cumulative Gem level.





Brand Three



Brand Five

lengths, roll gap, TIR, etc. This doesn't even address the manufacturing differences in frame design, density and materials, bearing and seal arrangements or related L10 life expectancy. For our purposes, we will focus on dimensional design inconsistencies. In Chart A, you will see an outline of the dimensional differences between six (6) manufacturers. While not tying each dimension to a specific brand, the comparison is based on one of the most commonly used specifications.

As you can see, the dimensions of each of these idlers are varied, with only one (1) consistency, the mounting centers (Dimension A). If we focus on brands Three and Five and turn our attention to Dimensions E, G and K, variances begin to emerge. These represent end stand height, roll length and center roll height. Looking at the below illustration, a pattern of potential perils to emerge.

Notice in Brand Three that the "E" dimension or end stand height, is $>1-9/16$ " shorter than that of Brand Five. Also, you will note that the "G" dimension or roll lengths of Brand Three are $\sim 3/4$ " narrower than Brand Five. The burning questions are: 1) What does this mean to me? 2) How does this affect my belt? 3) What steps can I take?.

Conveyor Belt Behavior

A conveyor belt has a singular purpose – to safely move material from one point to another. That's it. We are all familiar with the anecdote about distance. The shortest distance between two poles is a straight line. Conveyor

belting operates on the same principle. When torque is applied to a conveyor belt from the drive system, the belt will travel the shortest distance between the tail and the discharge pulley (terminal points). Because of the above mentioned dimensional differences between idler brands, the straight line can be the root cause to several modes of damage and/or failure within the conveyor belt, splice and the conveyor idler. Belt damage or failures can include mechanical edge tears and rips, delamination, idler junction fatigue, idler junction failure, splice damage and splice failure. Regarding idler failures, the uneven stresses placed on specific rolls within an idler set can create bearing failure and metal fatigue/failure along the face. For the purposes of this article, we will focus on the affects upon the conveyor belt.

Tracking Issues

Friction is the primary force found during the operation of a belt conveyor – particularly critical in the area of tracking. One of the key attributes of a conveyor idler is to create a positive effect on belt tracking. As found in most conveyor belting manuals, the below diagram (Figure No.1) illustrates how important contact between the conveyor belt and conveyor idlers are in regard to tracking. It is critical that the belt makes positive contact with all installed rolls within a troughed idler set. This can mean as few as two (2) rolls or as many as five (5) (Figure No.2).

For our purposes, a few assumptions are made regarding the conveyor belt and associated splice.

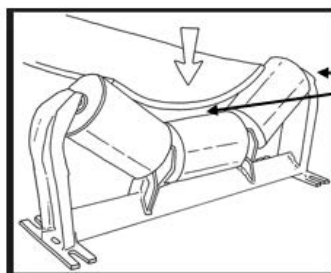


Figure No.1

Note the limited contact with the wing rolls and absence of contact with the center roll.

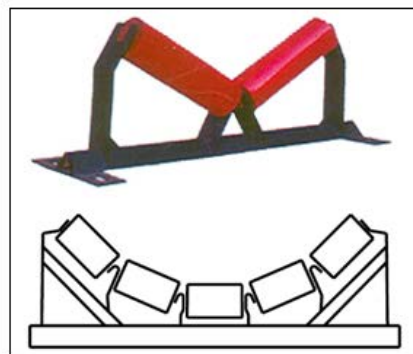


Figure No.2

1. The conveyor belt is straight and has no camber
2. The splice is square and is free from damage
3. The conveyor system is straight and is not damaged or out of plumb
4. The belt is center-loaded

With these assumptions made and accepted, we can focus on the contributions from properly or improperly specified and/or installed idlers. The frictional forces between the idler rolls and the conveyor belt are critical to holding the belt in place during operation. The conveyor belt requires consistent points of contact in which to travel and remain centered. This is one of the



Figure No.3

Idler Specification:

Belt Width:	24"
CEMA Rating Designation:	C
Troughing Angle:	35°
Idler Roll Diameter:	5"
Roll Lengths:	Equal
Roll Material:	Steel

areas where standardization of troughing idlers becomes paramount. As we are all familiar, troughing idler spacing varies, but more commonly falls within the four (4) and five (5) foot range. As an example, consider three idler sets installed back to back to back, on four foot centers. If the first and last idlers have the same dimensions, and the center idler dimensions differ, the friction loss is ~33% through that area (over an eight foot span). This can cause erratic tracking, along the entire span of a given conveyor system, and especially in areas where concave curves are present. (Figure No.3)

Potential Damaging Aspects Found in Transitions & Convex Curves

Conveyor idlers, while critical to the support and tracking of the conveyor belt, can often be the root cause of severe carcass damage and/or premature splice failure. We must first understand that while under tension, the conveyor belt will take the shortest route between the tail and head pulleys. In this finite space, proper idler selection and placement is paramount. As originally asserted in the opening paragraph, most idlers are purchased on written description, instead of actual dimensional compatibility. Two often overlooked areas where standardization is critical are transitions and convex curves.

The transition areas along a conveyor system are often ground-zero for structural carcass damage and potential splice failure. Transition is an area where the belt is placed through a cycle of compression and stretch. The belt requires ample support to make the "transition" from flat to fully troughed and then vice versa. If that support is not present and correctly applied, the belt is subject to structural deterioration and potential splice failure. Within this finite space, it is critical that proper idler placement be followed. The belt must be able to adapt to these forces evenly across the width of the belt without buckling, all while experiencing increased tensions. The resultant effect is that the conveyor belt is pulled tightly against the shape of the troughing idler with such force, the transverse rigidity of the belt is compromised. (Figure No.4).

Once compromised, the belt travels in an unsupported manner between the idler roll gaps (Figure No.5). Idler junction failure is an irreparable condition that most often results in premature replacement of the affected conveyor belt. Note: idler junction fatigue has the same outward appearances of idler junction failure. If identified soon enough, changes can be made to the conveyor system to halt the deterioration of the conveyor belt carcass.

The solution is simple and takes into account standardized dimensions and correct positioning of the idler set. The key is to support the belt through the transition with idlers that do not abruptly change the shape of the belt. Rather, the belt shape should change gradually to evenly distribute tensions across the width of the belt. Many conveyor belting manuals provide charts with transition distances based on conveyor belt carcass type. It would be wise to utilize conveyor modeling software provided by the conveyor belt manufacturer. As with idler manufacturers, belt characteristics - including modulus - varies from brand to brand. For best belt performance, it is important to

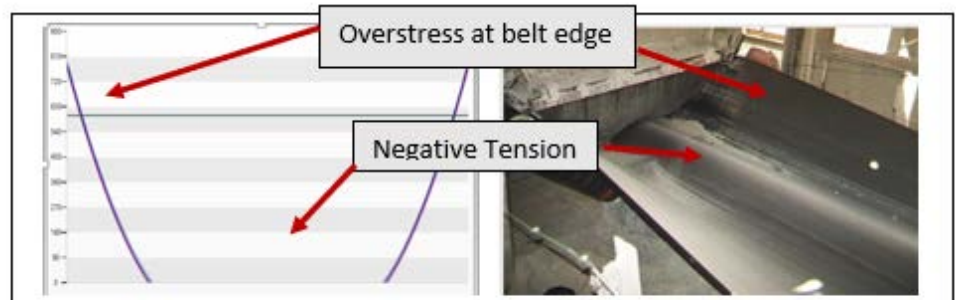


Figure No.4

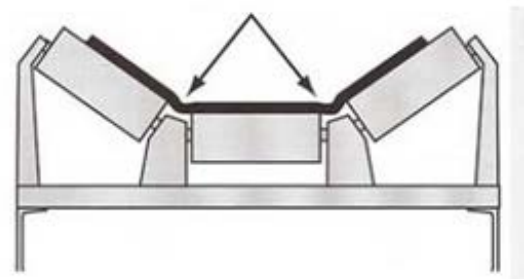


Figure No.5



Figure No.6

understand what the actual modulus values are versus an “industry standard” value. Typically speaking, the higher the modulus, the longer the transition requirements.

Convex Curves, like transitions, present belt support problems that can be detrimental to the longevity of the conveyor belt. Many times, convex curves are synonymous with conveyors that utilize a travelling tripper car. The design of the conveyor is such that the loading zone and tail section are kept out of the line of fire of the tripper car. These applications are typically found in paper mills and coal-fired power plants (Figure No.6). It is within the convex curve that poorly positioned idlers and/or dimensionally incompatible idlers can put a conveyor belt in peril. As previously asserted, the conveyor belt attempts to take the shortest route between the tail and head pulleys. It is critical that the belt is routed around the radius of the curve and not through the curve. By allowing the belt to cut through the radius, the carcass can become compromised as with the aforementioned transition distances (Figure No.5). Some common errors include utilizing “standard” spacing (4ft or 5ft) of the idlers through the curve, installing training idlers through the curve and utilizing multiple brands, with differing dimensional characteristics through the curve. Sometimes, it is a perfect storm of all three (3) mistakes. These errors are easily avoidable and can be corrected quite economically.

The first example in Figure No.6 illustrates a perfect storm of flawed idler selection, application and installation. However, the most critical issue is the placement of a training idler in the peak of this convex curve. The fact that the remaining idlers have standard spacing and are of different manufacturers are secondary in this case. The third example in Figure No.6 clearly illustrates the pitfalls of non-standardized idlers through the convex curve. Additionally, one of those idlers was a training idler. More visible than in any other position along the conveyor system, spacing and dimensional standardization within a convex curve is mission critical. In each of the instances from Figure No.6, the belt was either beginning to experience idler junction fatigue or complete idler junction failure. Both systems were inspected after these conditions were reported and the following recommendations were made.

1. Remove the training idler from the convex curve.
2. Standardize all idlers through the curve (and the system for that matter) to one brand and dimensional compatibility.
3. Cut idler spacing by half, installing addition idlers between each current set.

Conclusion

As mundane as they may seem, conveyor idlers are a critical component to a conveyor belt support system. This support system can be like a guardian angel, protecting the belt from wandering or supporting it through tight spaces and tricky curves. Conversely, the conveyor idler can be a nightmare, wreaking havoc to the structural stability of the belt and splice if improperly applied. It is important to keep mindful of the critical role conveyor idlers play in the reliability of a conveyor system, and its most expensive component – the belt.



See You Next Year!

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2017 Gem Levels

Thank you to these companies for their contribution to the NIBA Scholarship Fund.

Diamond Level

(Companies who have cumulatively contributed over \$7,500)

Advanced Flexible Composites Inc(AFC)
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Shaw Almex International Headquarters USA

Emerald Level

(Companies who have cumulatively contributed between \$5,000 - \$7,499)

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Passaic Rubber Company
Quality Belt Maintenance (QBM), Inc.
Reichel-Korfmann Co Inc.
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Shanghai YongLi Belting Co Ltd
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Ruby Level

(Companies who have cumulatively contributed between \$2,500 - \$4,999)

Belt Corporation of America Inc
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Conveyor Accessories Inc
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Rubber & Accessories Inc
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VIS USA LLC
Voss Belting & Specialty Company
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ANNUAL GO FOR THE GOLD!

Each year, NIBA – The Belting Association awards educational scholarships to children of parents employed by NIBA member companies.

Show your commitment to education – contribute to the NIBA Scholarship Fund today!

ANNUAL GO FOR THE GOLD

Highlight your collective company contributions at the Annual Convention.

GOLD

2017-18 contribution of \$800 or more



Each attendee will receive a gold ribbon on their name badge, and the company name and logo will be projected during the general session.

SILVER

2017-18 contribution between \$400-\$799



Each attendee will receive a silver ribbon on their name badge, and the company name will be projected during the general session.

BRONZE

2017-18 contribution up to \$399



Each attendee will receive a bronze ribbon on their name badge, and the company name will be projected during the general session.

DONATION AMOUNT

- ☐ I would like to make a contribution of \$_____ to achieve _____ status.*
- ☐ I would like to add enough to my current contribution to bring my total to \$800 to reach Gold status for 2017-18.
- ☐ I've already reached Gold status for 2017-18 but wish to additionally contribute \$_____.

**Your company's cumulative contributions count towards your overall status in the President's Club and towards gem levels*

Company Name: _____

☐ Check coming by mail or ☐ Please bill my credit card (information below)

Card Number: _____ Exp. Date: _____

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NIBA–The Belting Association

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MEMBER TO MEMBER

Do you have an item to contribute to NIBA's Member to Member News? Send your Press Releases to staff@niba.org or fill out the form at niba.org/members/submit-news

New Products

Flexco recently announced an enhancement to the Chevron Belt Cleaner. The drum has now been changed to a new design that allows the 3" rubber ring segments to be removed and replaced individually or as a complete drum. We've also added 72" and 84" cleaners to our standard offering.

Flexco is pleased to announce the release of Bridge Segments, a product line extension for our Segmented Transfer Plates. A Bridge Segment is used in conjunction with any size standard segment when spanning the gap between a pulley and a structure (i.e. chute).

Segmented Transfer Plates for 1.5" to 3.0" Gaps are now available from **Flexco**. The Narrow-Gap Segmented Transfer Plate line has several unique features allowing it to be installed into narrower gaps, including a two-piece mounting plate design that allows for multiple mounting configurations; raised, friction-reducing ribs on the top surface of the segments that reduce surface friction by nearly 10%; a taller and narrower extruded aluminum support bar that allows for installation into the smallest of gaps; and more.

Regional Equipment Manufacturer has delivered to Lutrell its first "PERF ANY BELT" machine. It will perf the thinnest one ply to the heaviest rubber in the market. The machine is CNC quality, accurate on both X and Y axis, operates on standard G code and is fully automated, wind/unwind in sync with table. Just load it up, start and walk away. Widths up to 84" available. Table is perfect for pin drive precision hole drilling, gaskets and, with the addition of a tangential knife, will do power turn belts.

Regional Equipment Manufacturer has delivered to Bowman-Hollis our small "V" guide machine. The perfect tool for distributors with multiple branches.

AFC's new DuraLam® HPF (High Performance Fabric) 4207LN possesses the characteristics needed for consistent performance in high temperature, abrasive applications. Download the white paper at www.afconline.com to see how this fabric can improve your production.

Other

Flexco is pleased to announce the 2017 Flexco® Bolt Solid Plate Sweepstakes. For more information, log on to www.flexco.com/camo.

Personnel



AFC (Advanced Flexible Composites) is pleased to announce the promotion of **Ismael Salomon** from Marketing and New Business Development Manager to Sales Training and Development Manager, Food Process Market Manager, and Southeast Territory Manager. He will be responsible for Florida, Georgia, Mississippi, Alabama, and South Carolina field operations, implementing national training programs, and managing activities relating to the food processing



AFC also announces the promotion of **Chris Thomas** from Marketing Specialist to Marketing Brand Leader. He will be responsible for developing and implementing strategies for corporate branding, marketing operations, and lead generation.

Newsworthy Items

Flexco was recently named a 2017 Top Workplace by the *Chicago Tribune*, finishing 17th among mid-sized companies and serving as the only manufacturing company to make the list.



Zhundong Economic and Technological Development Zone has the largest integrated coalfield found in China which may give people the impression of high pollution. However, these days, the sky is more and more blue. A belt conveyor system solves the pollution of dust, exhaust gas and noise in the process of traditional heavy truck transportation. In this project, **Huaxia** rubber used the "black technology" products, the world's third generation of steel cord conveyor belt HHE, while the product packaging created the longest single roll in the world, it greatly reduced the number of on-site joints, improving construction efficiency at the site.



Member Incentive Program

What Is It?

As a NIBA member, you know firsthand the value membership provides in supporting your company and in strengthening the belting industry. The **Member Incentive Program** offers the ideal opportunity to share the many benefits of membership with non-member distributor and fabricator companies. By reaching out to your network and encouraging fellow businesses to become members, you pass along the benefits of membership. In turn, NIBA will reward your referral efforts with a \$100 Visa card and recognition at the convention.

How the Program Works

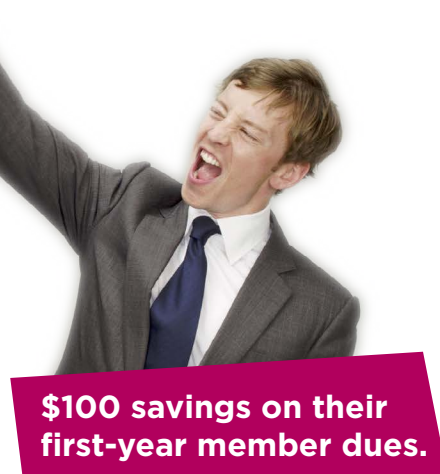
1. Your membership must be current and remain current.
2. "Leads" do not count toward the incentive program. You must bring in valid new manufacturer or distributor companies that are ready to commit to membership.
3. The new member* can apply online and must include the referring company's name and contact information on the application in order for the referring company to receive credit.



What *You* Get



What *They* Get



Extra Incentives

Encourage new members to take advantage of these special seasonal promotions:
Register for the Annual Conference and join NIBA at the **same time** for extra savings.

2017 only: **PTDA members** joining NIBA for the first time receive a \$200 discount.

*New member is classified as a company that qualifies for NIBA membership and is not a current member of the association or that has lapsed in NIBA membership for more than three (3) years from the new sign-up date.

Questions about membership?
Contact Michael Battaglia at mbattaglia@niba.org, 608-310-7549.



The NAM and the Manufacturing Institute are playing a leadership role on the President's Task Force on Apprenticeship and in the development of a new apprenticeship system. The Institute is hosting a workshop, *Responding to the President's Call – A New Vision for Industry-Recognized Apprenticeships*, on Wednesday, January 10, 2018, prior to the start of the CMA Winter Leadership Conference. Attend this session to receive an exclusive first look at the new model for "industry-recognized apprenticeships" and discuss the role your association can play in this new system.

This session is for anyone on your staff who is interested in learning more about apprenticeships or who is working on a similar initiative that you would like to share with other attendees.

This workshop is separate from the CMA Winter Leadership Conference, but you may register for it, as well as for the CMA Winter Leadership Conference at www.nam.org/cmawlc. If you have any questions, please let me know. I hope to see you in Philadelphia.

Find out more at <http://www.nam.org/Alliances/Council-of-Manufacturing-Associations/>.

Membership At-a-Glance



The Numbers

269 total members
118 Manufacturers
135 Distributors
16 Affiliates

Our Newest Members

New since the last Belt Line was published

- **Silver Spur Conveyors** (Distributor/Fabricator)

UID is March 11-14 in Indianapolis

2018 marks the 25th year that the University of Innovative Distribution has been serving the supply chain. Known worldwide for excellence in education, UID is sponsored by the leading distribution professional associations, in cooperation with the Department of Technology Leadership and Innovation of Purdue University.



As a UID sponsor, NIBA extends a \$1,000 registration discount to all its members.

Scholarship Application Period Opening in March

**Apply now for the
available NIBA scholarships:**

Memorial Scholarship

(eight scholarships available; \$2,000 each)

Applications due March 1.

Presidential Scholarship

(five scholarships available; \$4,000 each)

Application due May 1

As a member of NIBA – The Belting Association, we are pleased to offer you and your children the opportunity to apply for one of two different scholarships from NIBA. Both scholarships have been established to honor the memory of past officers, directors, and committee members for their strong leadership and dedication to the NIBA organization. Eligibility criteria varies by scholarship, but many are looking for applicants with a history of active participation in school, community, and/or church, especially in leadership roles. NIBA scholarships allow us to honor these past influential members by awarding scholarship opportunities to individuals who want to continue to make a difference in the lives of others with whom they have contact.



For Details and to Apply Online visit:
www.niba.org/scholarships