TESTIMONIAL

First thing's first, don't take our word for the benefits of The Litens Monster OAD™. Please read the testimonial below from our test fleet, Bi-State Development in St. Louis and you can see what Litens combined with B&C Truck Electric Service's world class service and support can do for you. We are grateful for the opportunity to now bring this quality solution to all of the transit industry and appreciate all the feedback we receive.

In July 2016, St. Louis Metro began testing the Litens OAD™ pulley after getting in touch with them to discuss our water pump belt failures on our Cummins ISL engines. Allen Steadman from Litens contacted me and we began a working relationship to set up a prototype and testing. Allen developed a prototype and we installed it in July 2016. After viewing the video of a before and after install of the OAD™ one could see the potential in the product. Right away the noticeable belt squeal on engine shutdown was gone, belt oscillations between the alternator drive pulley and the crankshaft pulley lessened along with a decrease and softening of the water pump belt tensioner movements. Upon shutdown the belt chirp disappeared due to the overrunning clutch allowing the alternator to free wheel to a stop. On the test drive the noticeable belt chirps and squeals when shifting was gone. Litens proceeded with some in-depth testing of the belt drive system on the bus and then used the info to closely tailor a new design to the engine application. The prototype was recently removed and had a new OAD™ installed in its place to begin its test phase. We also purchased 9 more to install on buses that show high numbers of belt replacements outside of the normal replacement schedule. All 9 of these buses with the new design OAD™ showed the same improvements as the first test bus in the belt squeals etc. We are monitoring belt usage, alternator bearing failures and are also looking at any possibility for any fuel MPG gain.

Tony Van de Riet
QA / Product Analyst - Product Development Dept - Metro BSD - 3330 Spruce St., St. Louis, MO 63103

B&C Truck Electric Service's Commitment

B&C Truck Electric Service Inc., a 20 year old family-owned manufacturing and distribution company has teamed up with Litens, the world's leader in automotive OAD™ (Overrunning Alternator Decoupler) pulleys. Together, we are introducing the Monster OAD™ to the transit industry aftermarket. Our commitment to you is to elevate our customer's experience beyond expectations by offering quality, choice, availability, value and support beyond the sale.

FEATURES & BENEFITS OF OVERRUNNING ALTERNATOR DECOUPLERS (OAD™)

- ***Proven Technology for twenty years with over 140 million sold.***
- ***Field tested and accepted by large scale metro transits.***
- ***Quick and easy install.***
- ***Soft start and stop allowing alternator to wind up or down.***
- ***Reduces over all FEAD system maintenance***
- ***Extends bearing life in the FEAD system.***
- ***Eliminates shut down belt squeal.***
- ***Eliminates belt hop between 1st and 2nd shift.***
- ***Reduces or eliminates belt break.***
- ***Extends belt life by three times in test fleet.***
- ***Reduces belt temp by 20%.***
- ***Typically doubles the life of belt tensioners.***
- ***No roadside service calls for belt flipping off in test fleet.***

MONSTER OAD™

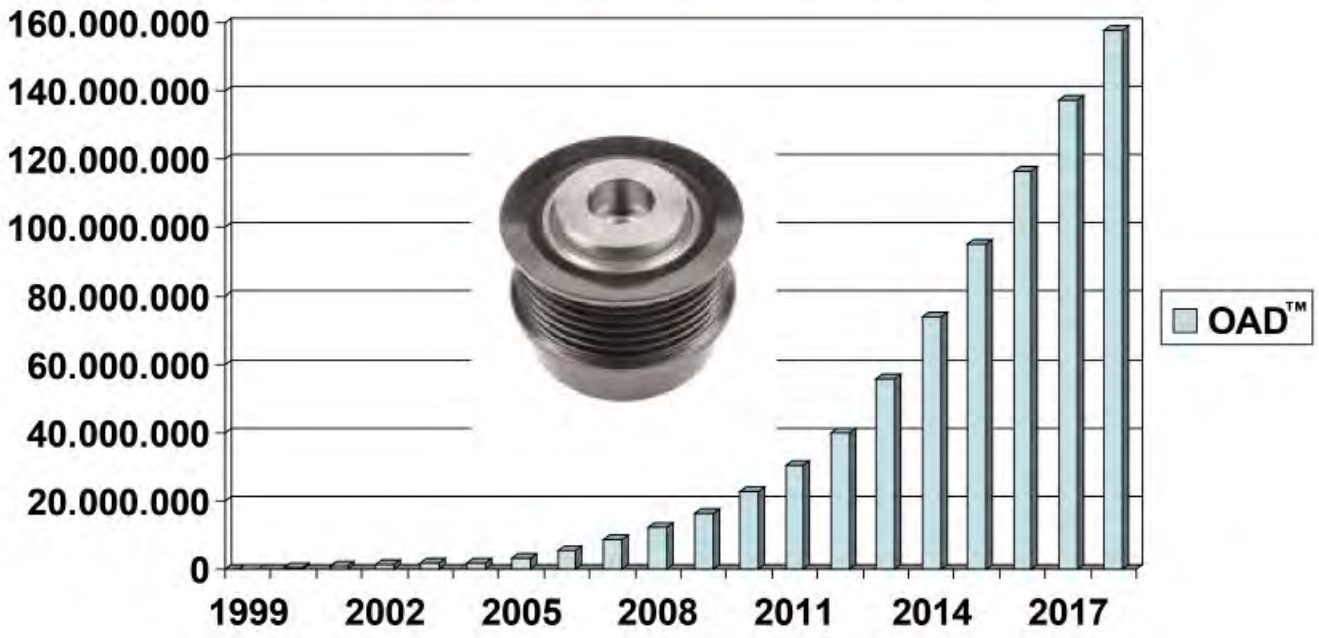
DECOUPLER PULLEYS

Each Litens' Monster OAD™ Pulley is specifically designed for its intended application. The part numbers we focus on in this brochure are designed specifically for EMP and Niehoff alternators used in the transit industry. These are the first pulleys of this kind that are available for transit applications. The conditions that exist in transit, such as idle time, low rpm operation, and 1-2 shifting, make the Litens Monster OAD™ Pulley the perfect cost effective solution.

WHO'S USING OADs™?

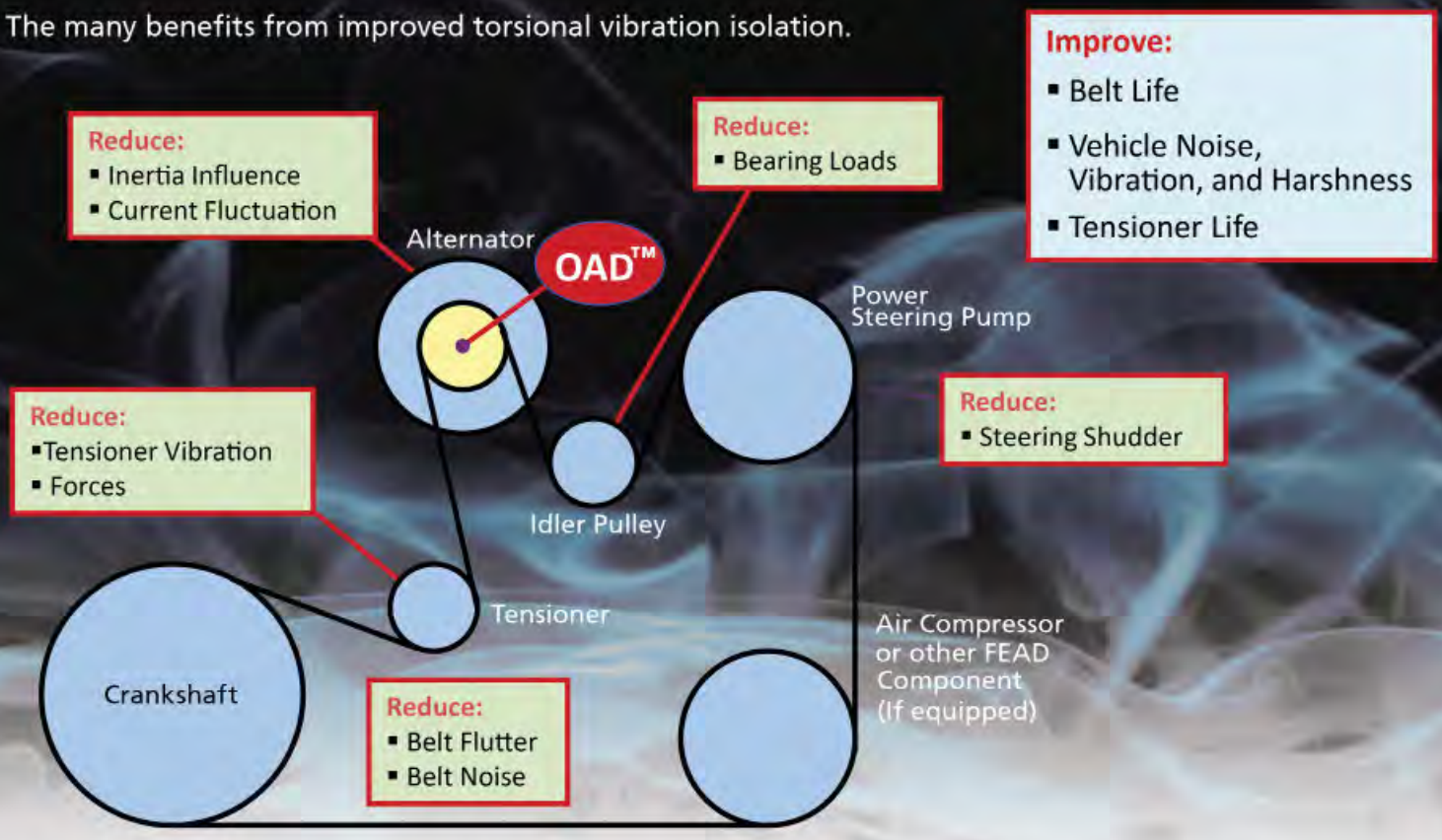
There are over 140 million OAD™ systems in service around the world today and growing. Many OEMs in the automotive segment are equipping every vehicle sold with OADs™ after testing and realizing the massive benefits they provide.

2013 VIO 52 million - 2018 VIO 158 million



WHAT IS THE PURPOSE / BENEFIT OF AN OAD™?

The many benefits from improved torsional vibration isolation.



WHAT'S DRIVING THE USE OF OADs™?

INCREASED:

- Torsional Vibration
- Alternator Inertia

CAN CAUSE...

POSSIBLE SIDE EFFECTS TO FEAD*:

- High dynamic belt tension fluctuation.
- High tensioner motion & wear.
- Increased belt noise & flutter.
- Increased in-vehicle vibration/rumble.
- Noise at start, stop or gear shifting.
- Steering wheel shudder.
- Reduced belt and bearing life.
- Premature wear of all accessory drive components

*FRONT END ACCESSORY DRIVE

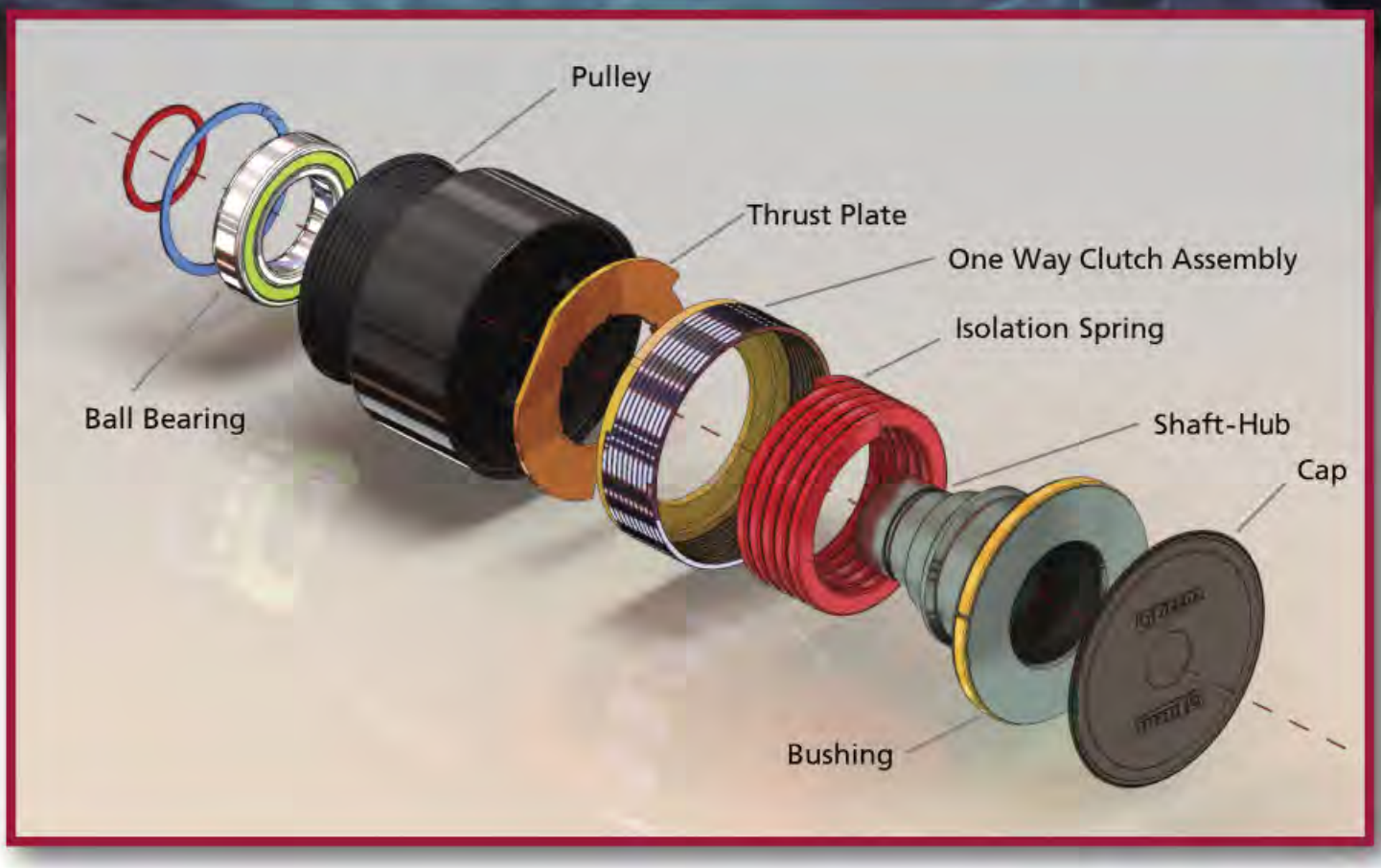
TRANSIT SPECIFIC SOLUTIONS

PROBLEM: Premature belt wear on the accessory drive belt (FEAD) system due to torsional vibration* resulting in failure or even flipping the belt completely off the drive pulley. This will result in a road service call or even a tow to the shop disrupting passenger service.

SOLUTION: Litens Monster OAD™ from B&C Truck Electric Service Inc., an exclusive partnership with Romaine Electric and Litens Aftermarket.

***TORSIONAL VIBRATION!**

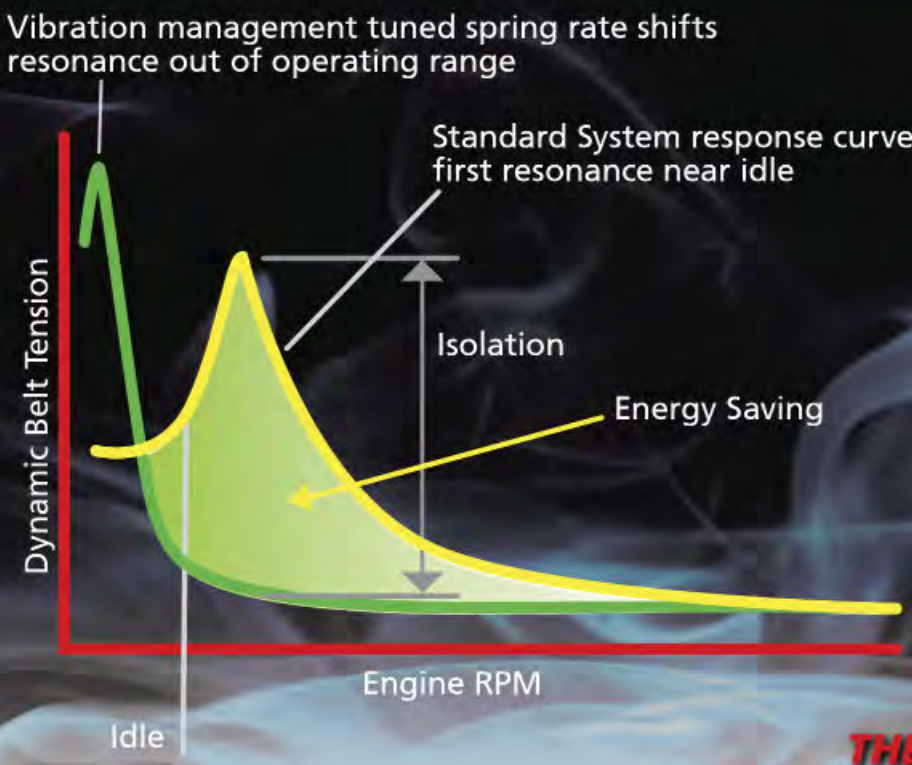
Each time a cylinder fires, the crankshaft speeds up or slows down a little bit. These firing pulses are known as Torsional Vibration (TV). The lower the RPM, the higher the Torsional Vibration will be. It is these firing pulses that act on the alternator rotor, trying to speed up or slow it down several times during every revolution of the engine. Without the Litens OAD™, these pulses create vibration for the drive and cause the belt tensioner to exhibit increased movement. Increased tensioner movement equals less durability for both the tensioner and the belt, as well as all the other components within the belt drive system (including the alternator).



The Litens OAD™ has a patented torsion spring inside. This is the secret to the high level of functionality that the Litens OAD™ is world famous for. This spring connects the alternator pulley to the rotor. Think of it as a "suspension system" for the alternator. This "suspension system" is needed to absorb the Torsional Vibration (TV) acting on the alternator inertia, which will seriously affect the belt drive system's durability.

The overrun function is another feature of the Litens OAD™ that allows the alternator to gently coast to a stop when the vehicle engine shuts off. This eliminates the shutdown chirp noises that are created when the mass of the alternator rotor tries to over-spin on shutdown. These noises are more prevalent, but not limited to vehicles with larger alternators. The overrun also occurs during transmission shifting where the rotor of the alternator actually spins faster (or syncronizes to the engine deceleration rate) during engine deceleration.

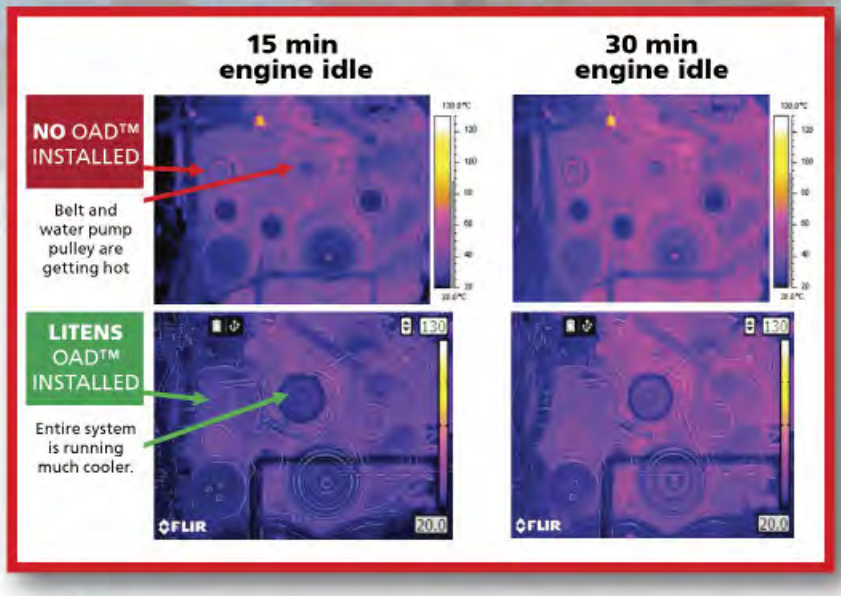
PROVEN ROBUST TECHNOLOGY



Installation is important to the FEAD (Front End Accessory Drive). The pictures at the bottom of the page show different drive configurations. The engine on the right is more advanced than the engine on the left as it has an auto tensioner as part of the drive system, where the one on the left loads each device in the FEAD system with the Torsional Vibration that is developed from the engine. Both installations would benefit from Litens OAD™ technology by eliminating the TV that affects all the FEAD components including the alternator.

One of the major issues that Torsional Vibration creates is belt flipping or even worse belt derailment or loss. The effects of belt flipping is premature damage to the drive belt making it necessary to replace the drive belt as often as every two months as reported by some transit authorities. Derailment can mean a costly tow, passenger disruption, traffic tie-ups and more.

THERMAL BENEFIT



MONSTER OAD™

DECOUPLER PULLEYS

MADE IN CANADA

Why do I want to introduce OADs™ into my fleet? If you are experiencing any of the following:

- ☐ **1. Belt breaking**
- ☐ **2. Belt hop or derailment**
- ☐ **3. Belt squeal in the 1 - 2 shift**
- ☐ **4. Short belt tensioner life**
- ☐ **5. Short belt life**
- ☐ **6. High belt temperature**
- ☐ **7. Premature bearing failure of the FEAD** (Front End Accessory Drive) **components**
- ☐ **8. Torsional vibration in the FEAD system**
- ☐ **9. Complete belt disengagement resulting in roadside service call or tow**

PART NUMBER	DESCRIPTION	ALT TYPE
920101	*SPLINED VERSION*	*REMY, DIXIE, EMP*
920102	*KEYED VERSION*	*NIEHOFF*

IMPORTANT INFORMATION

Never interchange a different brand for a Litens OAD™ as they are not the same and damage will occur to the FEAD system. The diameter, threads, spacing, and length make each application unique. The internal spring is also tuned to the specific engine application and therefore two identical OADs™ may look alike but are very different. Check the part number before replacing.

Partnerships built to bring solutions to you!

B&C TRUCK ELECTRIC SERVICE, INC

Romaine Electric PRECISION PRODUCTS

Litens® Delivering Innovation™