

# APPLICATIONS FOR AUSTEMPERED DUCTILE IRON CASTINGS

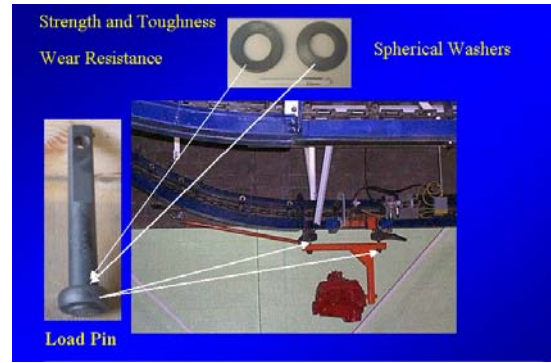
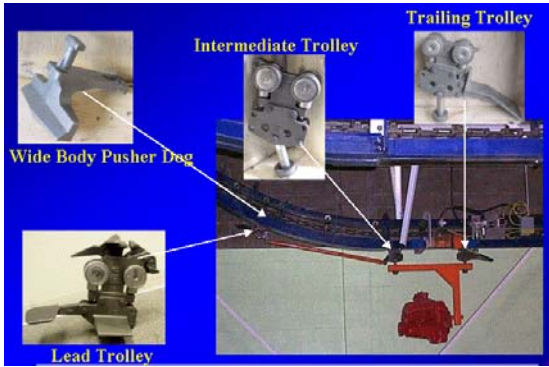
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Following is a discussion of several castings produced in Austempered Ductile Iron by Farrar Corporation. Each application has certain requirements that can be satisfied by ADI.

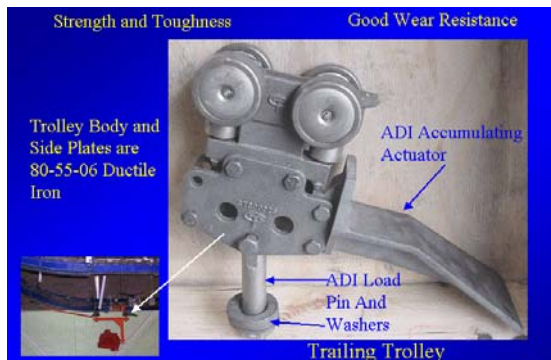
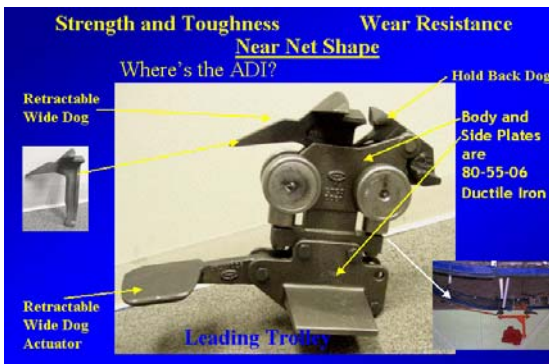
What determines when a casting should be produced as Austempered Ductile Iron? Following are several examples of applications where properties of ADI fit well into the requirement of the casting components. These properties include high strength-to-weight ratio, good toughness, good wear resistance, good machinability prior to heat treatment, relatively low cost compared to other materials with like properties, and can be cast to near net shape which eliminates machining operations.



A company producing overhead conveying equipment had always used steel forgings for the component parts. When the tooling for a Side Link Pusher Dog was worn and needed replaced an opportunity arose for ADI. A quotation for the same part in ADI showed the customer that not only was the tooling much less expensive, but the parts were less as well. One reason for the parts to be less expensive was that a lubricating hole could be cast into the part rather than being machined into the forging. Fortunately one of their engineers was receptive to a change and the first ADI part was produced by Farrar Corporation. Since that time there have been many other conversions within this industry to Austempered Ductile Iron. Now, ADI is the first choice of material rather than steel forgings or weldments.

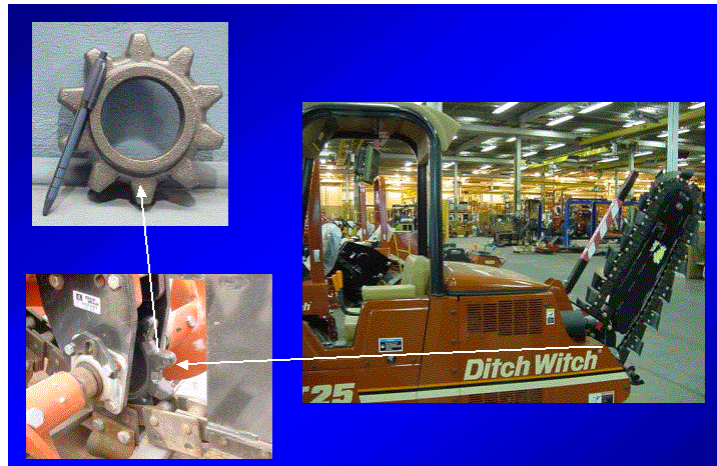


Examples of components in the overhead conveying equipment now made out of Austempered Ductile Iron are shown above. ADI is chosen because of its toughness, strength, and wear resistance. The 80-55-06 Ductile Iron trolley bodies and side plates are the only casting components not made of ADI. This material has proven to be a dependable and economical choice for the overhead conveying industry.

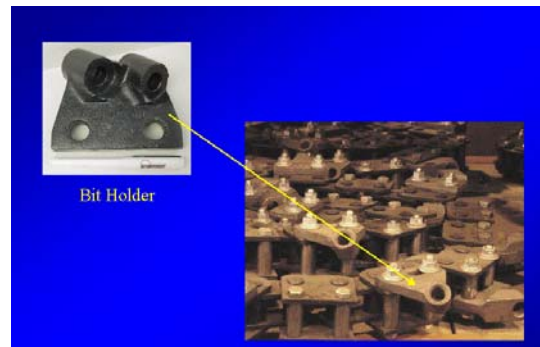


Taking a closer look above at the Leading Trolley and the Trailing Trolley, the actuators are of ADI material primarily for the wear resistance and strength. The retractable actuator of one system rides up on the accumulating actuator of the next system. The retractable dog is activated by the actuator and is engaged for movement of the system by the pusher dogs. The load pin holds the load being conveyed, and the spherical washers help to keep the load and the pins from binding as it travels up and down the conveyor system. Obviously strength is of primary concern for the load pins.

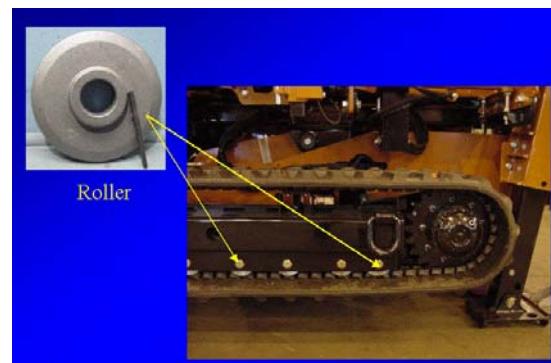
Another industry where the choice of material is Austempered Ductile Iron is in construction equipment, and in particular trenching equipment. Strength and wear resistance are definitely required for the components of this type of equipment where they must work in a hostile environment of abrasive dirt and sand. Another important advantage is being able to cast to near net shape. The only machining required on the gear below is a small amount of clean up on the inside diameter. The gear is driving an auger that moves the dirt to either side of the trench, thus working in a pretty nasty environment.

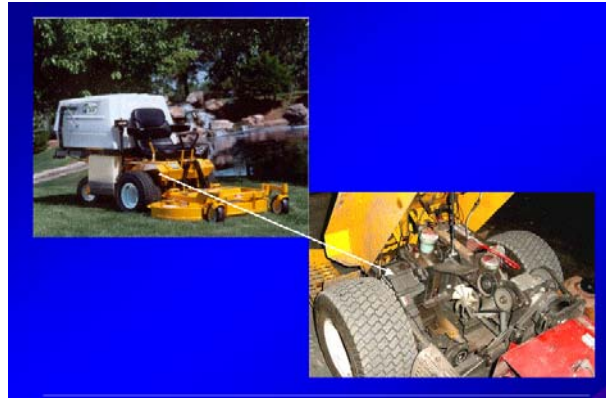


Bit holders are used in equipment that trench in hard, rocky soil, so strength and wear are quite important. Many of the bit holders are cast to shape with no machine work required. The bit holders were originally a fabricated part with a great deal of machine work required. A casting has proven to be quite cost effective in this application.

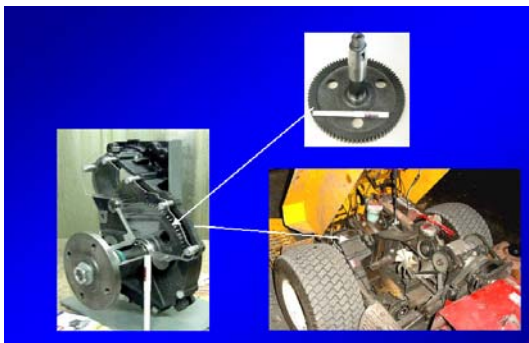


Below are two more applications on crawler tractors for construction equipment. The drive sprockets and rollers used on the track system are both ADI castings. Again, the advantages of strength, toughness, and wear resistance are of utmost importance.



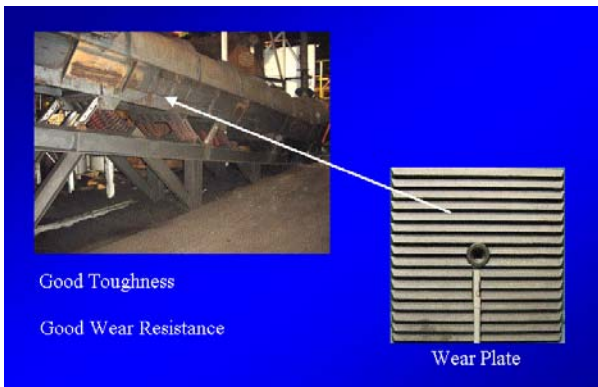


A person might wonder what component of a lawn mower could possibly have an ADI casting requirement. In this commercial type lawn mower, two drive gearboxes are required and they each have a gear, which is made of ADI.



Good Toughness  
 Good Wear Resistance  
Good Machinability Prior To Heat Treatment

The gear shown above also serves as the axle for the driving wheels. It is a conversion from steel weldments, which was very difficult for the manufacturer to hold necessary tolerances. Consequently it was noisy and unreliable. As a casting, all of the machining, except grinding the bearing surfaces, is done prior to heat-treating. Extremely close tolerances can be maintained, thus eliminating gearbox noise and is very reliable for the customer. This gear and axle utilizes all the important properties offered by ADI. The entire gearbox shown above is cast, machined, and assembled by Farrar Corporation.



Good Toughness  
 Good Wear Resistance

Wear Plate

The last example of an ADI casting is one that is sure to be familiar to all foundrymen. Using ADI for the wear plate in an inclined conveyor has increased the amount of wear provided by gray iron castings. It also provides ductility and toughness that cannot be provided by a chrome iron wear plate.

We have shown a few examples of Austempered Ductile Iron castings that are being produced by Farrar Corporation. Some of the examples may be for applications not normally considered to be a candidate for ADI. We must always be mindful first of all of the advantages of castings over many other processes. Then we must be able to take the advantages of a casting and add the excellent properties afforded by ADI. We now have a process producing a casting with equal or superior physical properties, that can be produced at a cost to our customer lower than many other materials and/or processes currently being used.

