How ethanol has changed transportation in Iowa

No discussion of environmental issues is complete without looking at the ethanol industry in Iowa. The ethanol boom is not only creating new markets for corn, it is changing the way the commodity is being shipped, both within the state and to regional, national and foreign markets.

Before the ethanol boom, corn shipment was relatively straightforward – what could be used locally was shipped by truck to processors or feeding operations. The rest was trucked to the local elevator where it was shipped to more distant national or international markets in the most cost effective way – by truck, rail, barge or a combination of modes.

With the ethanol boom, more farmers are trucking their corn to biofuel processing plants. Once processed, a bushel of corn produces 2.7 gallons of ethanol and 17 pounds of a high-protein feed, often referred to as dried distiller's grain or DDG for short. Because ethanol absorbs water and impurities that reside in fuel pipelines, ethanol cannot travel via pipeline and must be transported by rail tanker car or tanker truck. The high-protein feed is trucked to local livestock operations, but production is often higher than can be used locally; so, DDGs are also shipped to livestock operations farther west in rail hopper cars.

The rapid growth of the ethanol industry in Iowa has transformed the transport of corn and corn products in just a few years:

- Fewer hopper cars and unit trains of corn are shipped by rail.
- More corn is trucked to local facilities.
- As production increases, the shipment of ethanol and DDGs by rail will continue to increase, more than making up for any loss of corn shipments.
- Local truck and train traffic can increase dramatically when an ethanol plant locates in an area.
- Ethanol and DDGs are shipped to different destinations than corn.
- Unloading facilities at destinations are often inadequate to handle the increase in ethanol shipments.
- Rail tanker cars are in short supply as manufacturers struggle with backlogs of orders

Craig O'Riley from the Iowa DOT's Office of Systems Planning has been monitoring the changes in rail shipments of corn and the way these changes have affected railroad companies. "In the next few years, with the projected increase in the rate of production of ethanol, it is expected that Iowa may become an importer of corn, rather than an exporter."

O'Riley estimates that 160 daily incoming truckloads of corn will be required at an ethanol plant producing 100 million gallons annually. From that same size facility, one-third of the ethanol and ethanol by-product will be shipped from the production facility by truck. The remaining two-thirds will be shipped by rail.

O'Riley used an Iowa State University study prepared in November 2006 to calculate that 6,500 rail cars of ethanol and ethanol by-product will be shipped annually, along with 8,800 semitrucks outbound from a typical 100 million gallon production facility each year. "That could mean a large increase in truck traffic near ethanol facilities," said O'Riley.

With changes of this magnitude there is a cost. Ethanol plants must build extensive rail infrastructure to store and load rail cars, which can cost up to $2 million per mile to install.

Railroads are investing millions in infrastructure improvements to accommodate heavier rail traffic, adding switches, additional track, enlarging yards, etc., to efficiently handle growing ethanol shipments. As one example, the Union Pacific is investing $61.1 million in track

improvements in Iowa and Minnesota, and another estimated $15 million in Nebraska, to support the growing ethanol business. Shortline railroads and branch lines may require upgrades in track and bridges to accommodate heavier cars and increased traffic. Iowa Northern Railway is one such railroad that has planned investments of $55 million over the next six years for these type of improvements. Traffic patterns in the vicinity of ethanol plants change, which may also necessitate upgrading the highway-railroad crossings. Increased truck traffic to ethanol plants may result in the need to add capacity and improve infrastructure on the state's roads system, such as adding lanes, traffic lights or turn lanes.

When the expected production of ethanol using plant fiber (corn stalks, switch grass, wood chips, and other cellulose fibers) becomes less expensive than corn, expect other yet unforeseen changes in the transportation system. Whatever the future brings, Iowa's ethanol industry will continue to evolve and spark lively conversation in the months and years to come.