Board Road, Crane Mat Analytics Provide An Economic Twist For Ties

By Petr Ledvina

Ties and lumber roll off the line at a sawmill.

Railway Tie Association (RTA) leadership came up with an interesting idea late last fall. As the number of oil rigs declined due to sliding oil prices, they considered what the impact would be on sawmill production of crane mats and board road.

RTA contacted colleagues with *Hardwood Market Report (*HMR) and asked for some historical board road data. Not only did HMR provide data for board road but they also wrote an interesting article covering the use of the product as well as a forecast of board road and crane mat demand in 2020 and 2021. That article served as a springboard for RTA's data analysis of both the provided and collected data.

In summary, the HMR article, "Board Road and Crane Mat Outlook 2020—Pipeline and Wind Farm Construction Will Drive Stronger Demand," provides a thorough background on the use of the timber. The board road lumber is part of a family of industrial lumber of which crossties, pallet lumber and cants are also members. These materials usually come from the center of low-grade hardwood logs.

Board road and mats are used to access the construction sites of oil drilling rigs, wind turbines and pipelines, and also to create platforms for cranes and other heavy equipment. The article describes the pinch on the sawmills as oil prices dropped in 2015, when the construction of oil wells declined dramatically.

The rejection of the Keystone XL pipeline plans added to anxiety in the market at that time. Based on the information gathered by the HMR team, the prediction for the near future was slightly optimistic for board road and mats demand, with stable prices. Bear in mind that this article was published on Jan. 24, at which time little was known about the extent to which the coronavirus would affect the U.S. and global economy.

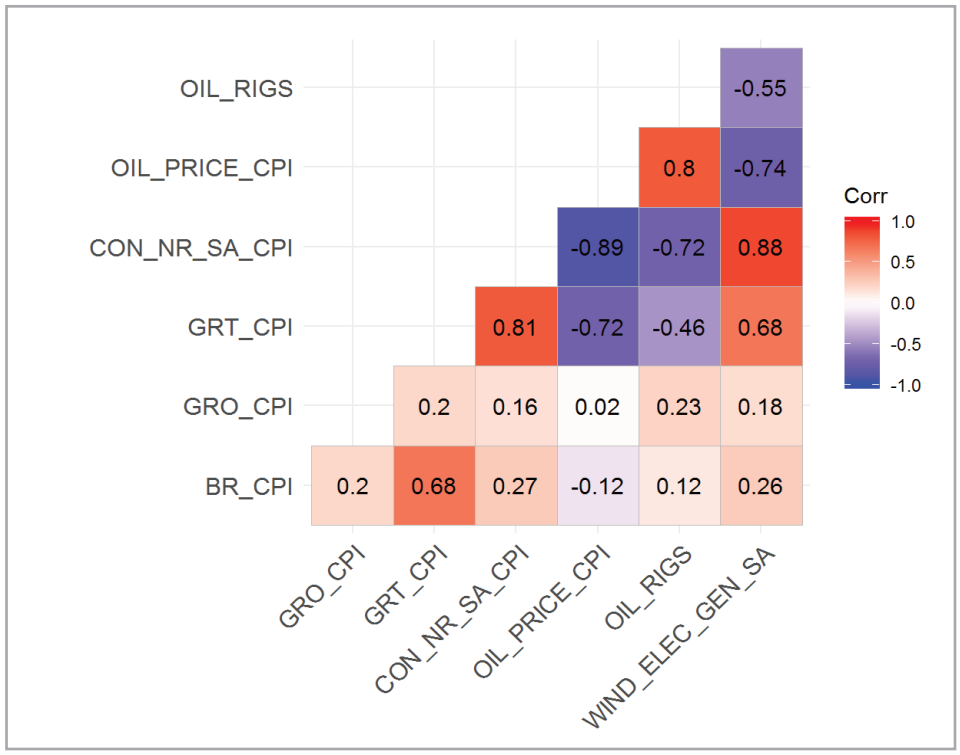
This background information, together with board road data, provided an opportunity for some statistical analysis. RTA gathered data about the number of oil rigs, the monthly average price of oil and wind turbine electricity generation, and added the price of green ties. As for pipeline construction, where board roads are also used, there was no available data. Instead, non-residential construction spending levels in the United States was considered as a catch-all variable.

All prices were adjusted by CPI, and wind turbine electricity production needed to be seasonally adjusted. The following graph shows a correlation matrix of the mentioned data (variable abbreviations: GRO_CPI – green red oak 4/4 #1, GRT_CPI – green tie national average price, CON_NR_SA_CPI – seasonally adjusted US non-residential construction, OIL_PRICE – average WTI oil price, OIL_RIGS – count of operational oil rigs in the US, WIND_ELEC_GEN_SA – seasonally adjusted wind turbine electricity production; sources of the data: HMR, EIA, RTA calculations). (Figure 1, page 10)

As the primary focus was on the association of oil rig count and board road price, the correlation between the two variables seemed to contradict the original assumption. However, further research on the matter yielded some clues.

Before an oil rig becomes operational, it requires a certain amount of time for construction. This means that board road lumber is purchased well before the rig is operational, and would imply that the demand/price would go up several months before the rig's completion (mineralrightspodcast.com, investopedia.com). The strongest correlation of 0.548 was at lag 14. Wind turbines also need some time for construction. According to the European Wind Energy Association, a 10 MW farm can be set up in less than two months. ▶

Figure 1: Board road analysis



However, there was no significant change in the correlation coefficient for the first three lags.

Oil price is strongly correlated with rig counts, so higher lags were more significant. However, the correlation 0.289 was still weak at lag 12. Also, new drilling and fracking technology and construction of new pipelines such as the Dakota Access Pipeline have lowered the cost of oil production since the previous slump in oil price. This could explain the low correlation; hence, oil price was not considered in further analysis.

Non-residential construction spending did not have a clear peak in correlating lags with price of board road, so the original series remained in the analysis.

Attention was also given to the correlation of Green Red Oak 4/4 #1C, since previously the 4/4 2A was considered the benchmark for tie pricing, and the expectation was that there would be strong correlation of the 4/4 #1C with the board road price. However, the initial correlation of 0.199 improved only modestly at lag 7 to 0.41, thus shattering expectations.

There was however, a strong correlation with the price of green tie. With six months' lead, the correlation was 0.76.

Many RTA members had been puzzled by the breakdown of the correlation between green tie and green red oak which in the past was held as a benchmark. *Crossties* magazine readers are perhaps familiar with the "Tie Pricing Report" provided by RTA, in which the correlation between these two products is measured in nominal and PPI adjusted prices for several time intervals. In recent years, the correlations have been all over the place. However, some caution is necessary when considering these correlations. For the oil rigs and the

Stacks of lumber headed to crane and road mats.

green tie, there appears to be evidence of clustering and persistency, or price stickiness (Figures 2 and 3).

One possible reason could be related to log supply issues for sawmills. For this investigation, tie Inventory-to-sales (ISR) ratio was used as a substitute variable for supply issues. From the tie ISR, an indicator was defined as "high" if the tie ISR was above 0.7 and "low" if it was below 0.7. The oil rigs vs. board road scatter plot shows that the cluster containing points 93 to 107 is quite possibly "outlying" due to supply issues. Other reasons for the clustering may be involved as well. For the green tie and board road graph, those points would be 82 to 88.

Based on the analysis, the price of board road has the highest correlation with the price of green tie, as these two compete for the same log. Thus, by extrapolation, it seems that when oil is booming and wind farms are going up, some sawmills shift production from ties to board road, possibly causing the tie ISR to go down (Figure 4), and eventually tie prices follow along in about six months as suggested in the Tie Pricing Report.

This analysis supports the findings of the HMR article that, if the construction of oil rigs, wind turbines and pipelines increases, then the higher demand for board road and mats should push the price up, resulting in higher prices for green ties under normal market conditions. Moreover, this analysis seems to shed some light on the breakdown of the correlation between the prices of green tie and green red oak 4/4 #2A. ■

Figure 2: Price of board road and oil rig count (lag 14) with factor indicating low and high tie ISR

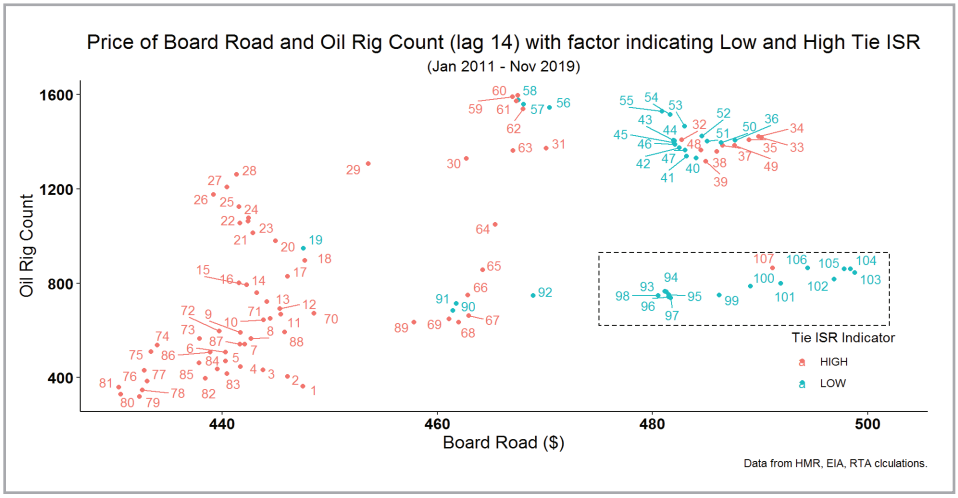


Figure 3: Prices of board road and green tie (lead 6) with factor indicating low and high tie ISR

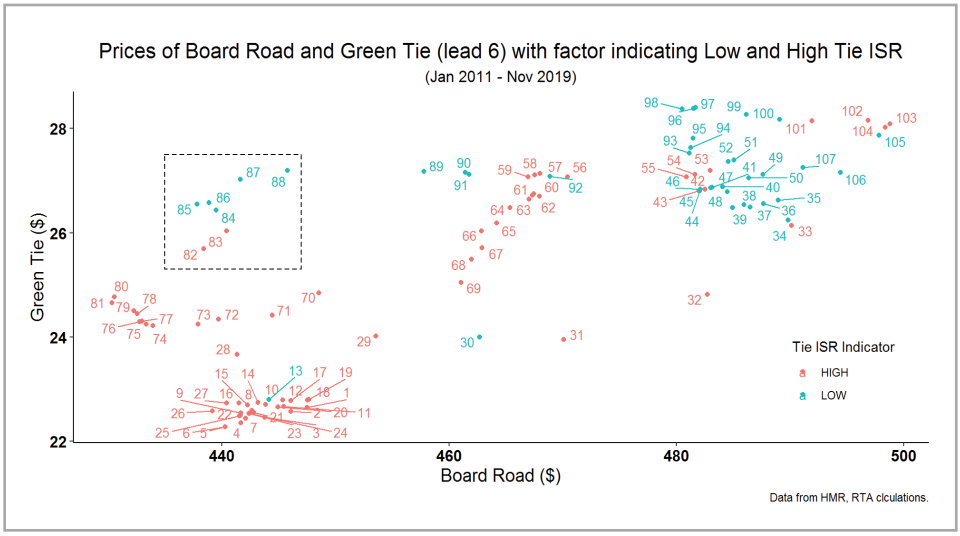


Figure 4: Prices of board road vs. tie ISR