RTA, ZETA-TECH Associates Update SelecTie Model For 2006

In 2006, ZETA-TECH Associates Inc. updated the Railway Tie Association's (RTA) *SelecTie* crosstie economic analysis model.

The *SelecTie* model incorporates all of the key input and influence factors, including costs (materials, labor and equipment), maintenance activities, and engineering equations for component life prediction. The *SelecTie* model has been used as a decision-making tool by railroads, transits and consultants.

The *SelecTie* model provides an economic benefit analysis of alternate crosstie configurations. While the focus is on wood vs. concrete ties, the model can be used for alternate materials. The model features user selection of maintenance activities and cost categories and has the capability for detailed cost inputs at the individual gang and equipment level. The model uses a Present Value Life Cycle Cost analysis, and the results are shown as net benefit and return on investment (ROI).

The model incorporates default values for all of the inputs so as to allow for easy use and also to provide a baseline number when the model is used. These default values were last updated in 1996 and required updating.

In order to ensure accurate input values, this update was performed with a major U.S. Class I railroad. These revised default values addressed the range of different track maintenance activities and include:

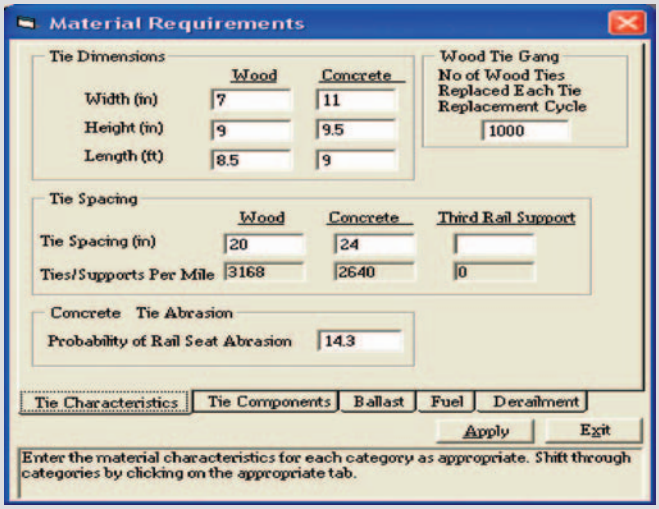
- Equipment, Labor and Material Costs
- Labor Gang Composition
- Productivity Rates for Different Activities
- Material Requirements

Figure 1 shows the material requirement updates that included the number of wood ties replaced each replacement cycle, ballast type, probability of derailment and derailment characteristics.

Figure 2 shows the unit cost for different materials, including

- Wood and Concrete Ties ▶

Figure 1



SelecTie Upgrade Available

All current SelecTie licensees are eligible for the 2006 default value upgrade based on member status. Contact RTA offices at (770) 460-5553 or via email at ties@rta.org for more information.

Figure 2

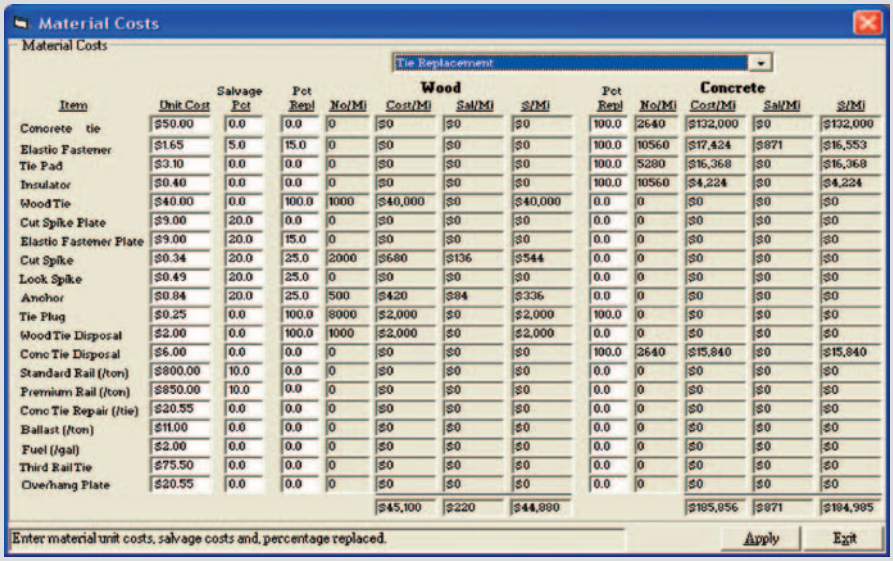
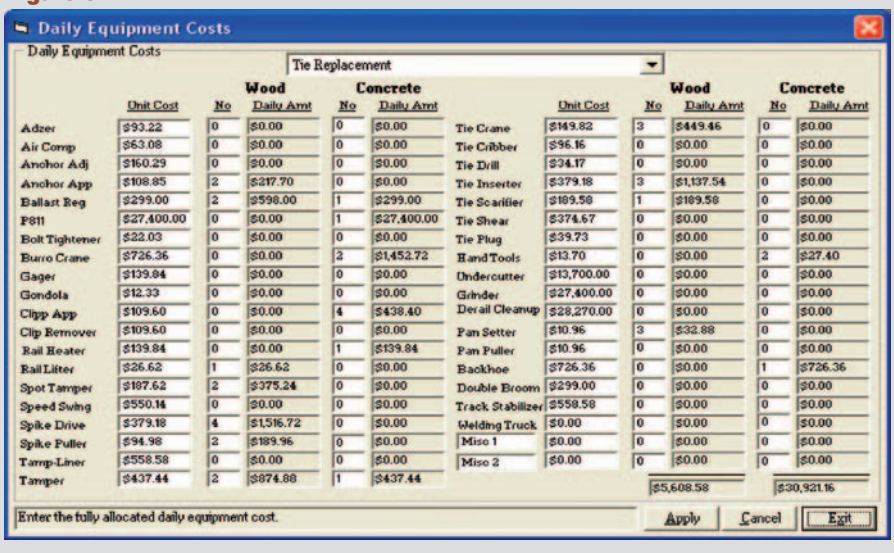


Figure 3



- Elastic Fastener
- Tie Pad
- Insulator
- Elastic Fastener Plate
- Standard and Premium Rail
- Concrete Tie Repair
- Ballast (per ton)
- Fuel Cost (per gallon)

Figure 3 shows the equipment unit costs, which were increased to reflect current costs in the industry. The model also includes the number of units in a gang, required for both tie types updated for different maintenance activities.

Figure 4 shows the updated daily wages for each labor group that were increased to reflect current labor costs. The model also includes the number of persons in each labor group by maintenance activities (e.g., rail replacement, rail transposing, tie installation, surfacing, undercutting and gaging).

Figure 5 shows the productivity rates that were updated for the key maintenance activities to include rail replacement, rail transposition, tie installation (ties/day), rail grinding, concrete tie repair, gaging (wood ties), and undercutting (maintenance and conversion).

The updated SelecTie model retains all of the flexibility and accuracy of the original model and will allow *SelecTie* to continue to be an effective tool for analyzing wood, concrete, and alternate tie material costs and benefits. **Figure 6** and **Table 1** show one sample case result incorporating most of the major maintenance functions included in the model. §

Figure 4

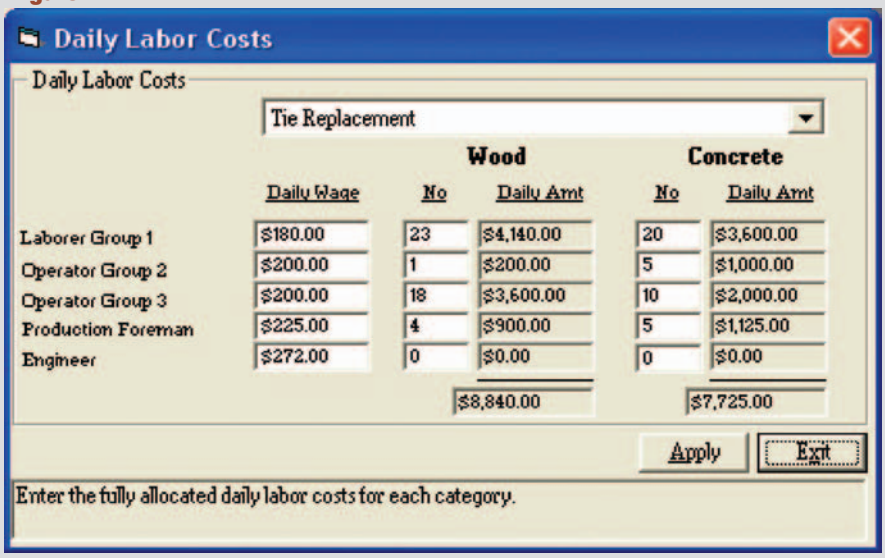


Figure 5

Figure 6

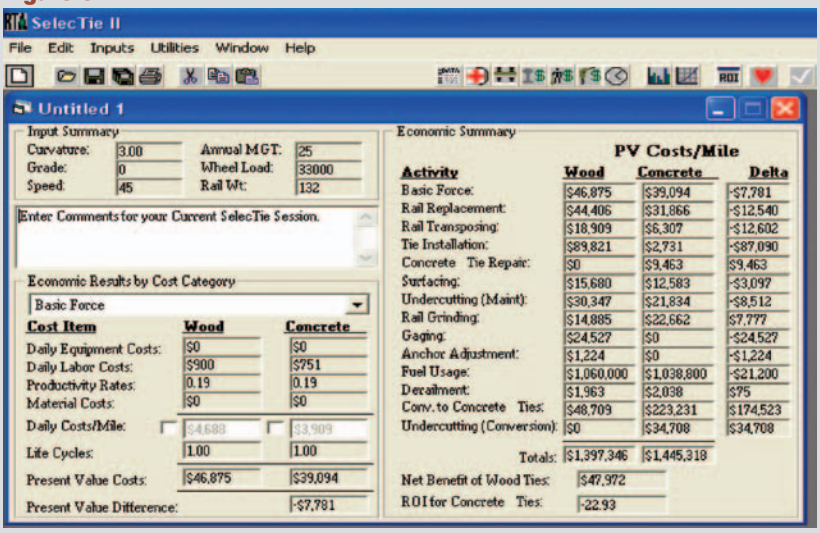


Table 1

Activity	Wood	Concrete	Difference
Basic Force	46,875	39,094	-7,781
Rail Replacement	44,406	31,866	-12,540
Rail Transposing	18,909	6,307	-12,602
Tie Installation	89,821	2,731	-87,090
Concrete Tie Repair	–	9,463	9,463
Surfacing	15,680	12,583	-3,097
Undercutting (Maintenance)	30,347	21,834	-8,512
Rail Grinding	14,885	22,662	7,777
Gaging	24,527	–	-24,527
Anchor Adjustment	1,224	–	-1,224
Fuel Usage	1,060,000	1,038,800	-21,200
Derailment	1,963	2,038	75
Conversion to Concrete Ties	48,709	223,231	174,523
Undercutting (Conversion)	–	34,708	34,708
Totals	1,397,346	1,445,318	47,972
ROI for Concrete Ties			-22.93