New Program Helps Railroads Evaluate, Determine Crosstie Life And Maintenance Requirements

RTA Introduces *TieLife*™ Program

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With the increased cost of track maintenance, as well as the reduction in maintenance budgets, it has become increasingly important for railroads to understand the life of track components, specifically crossties.

To help railroads do this, ZETA-TECH Associates Inc. has developed for the Railway Tie Association a user-friendly computer model TieLife™, for determining future crosstie requirements. The model was developed to assist the user in understanding the expected life of crossties under different track and traffic conditions, along with the corresponding annual tie requirements. The model was developed for the Windows operating system and is an easy-to-use and intuitive maintenance/planning tool.

The model evaluates track and traffic data as primary inputs, including length of track segment, climate of segment, type of fastening system and distribution of trackage with respect to degree of curvature and annual traffic density. This primary input screen is shown in Figure 1, which shows that the example analysis segment is 1,000 miles long with a weighted average annual traffic density of 12 MGT and has trackage distributed according to the matrix of degree of curvature and annual traffic density.

Based on the input data, the average

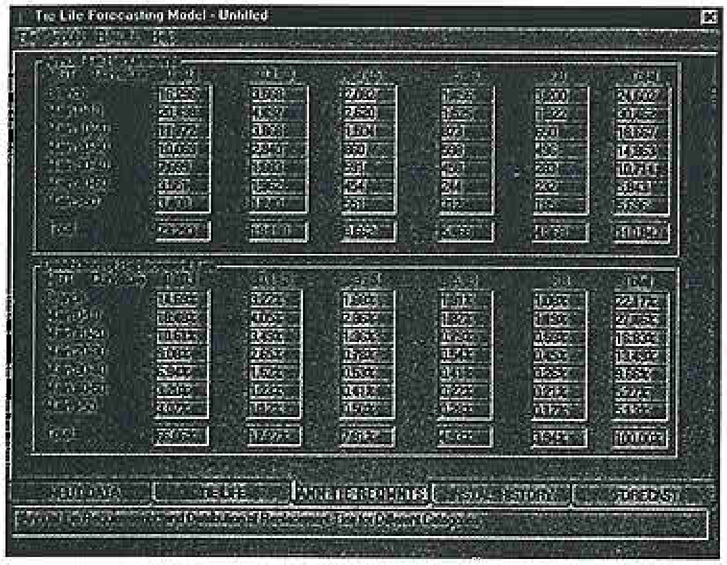

Figure 1

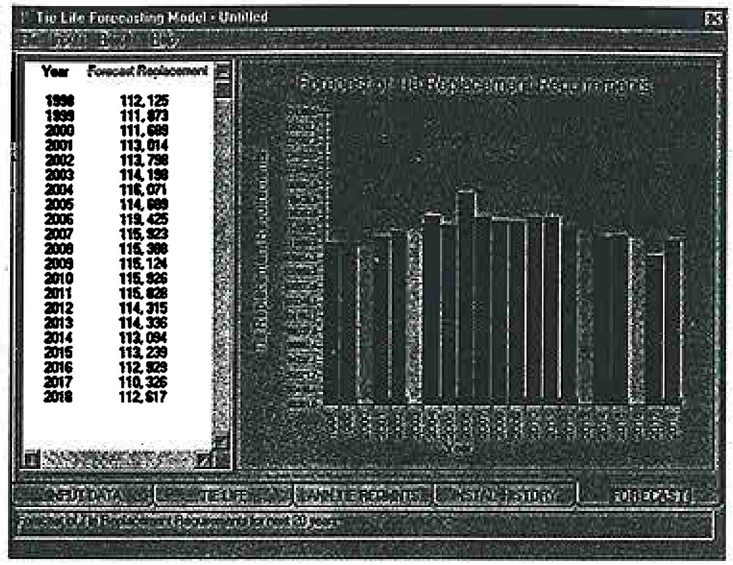

Figure 2

life of a tie is determined for each category of trackage (distributed by curvature and tonnage) using an empirical model calibrated to historical freight railroad experience. It should be noted that the model allows the user to override these calculations should their individual experience be unique. Utilizing the tie life information and distribution of trackage, a matrix of annual tie requirements can be determined based on a steady state failure rate. This information is presented to the user as number of ties required annually (and percentage of total annual tie requirements) for each category in the trackage distribution matrix (see Figure 2). In the example shown, it can be seen that on average, a total of 110,947 ties would be required annually, as distributed by the matrix of curvature and tonnage.

Since ties do not fail uniformly, and are not replaced uniformly, it is further required to understand the actual annual crosstie requirements for a segment of track under analysis, given the historic installation of crossties on that segment. The model allows the user to input the quantity of ties installed on the analysis segment for the past 40 years, or for whatever time frame the data is available. Based on the specific tie installation history and the average tie life (distributed by curvature and tonnage), a forecasting algorithm is used to determine more accurately the quantity of ties required annually for the analysis segment. The forecasted tie requirements are presented in table and graphical forms as shown in Figure 3.

In the example shown, for the next three years, the analysis segment will require 112,125; 111,873; and 111,689 ties respectively.

It can be seen from these values that more than the steady state average number of ties will be required in the first three years. This further reinforces the fact that ties do not fail uniformly and that installations occur based on the actual failure history as a function of the specific track and traffic parameters. Therefore, TieLife™ can be used to determine tie requirements based on expected failure rates and actual historical replacement rates.

TieLife™ was developed as a user-friendly maintenance/planning tool to be used by railroads and suppliers for evaluating and determining the life of crossties under various conditions and the resulting annual crosstie maintenance requirements considering historical tie installations. ◆

CONTINUED ON PAGE 33

CONTINUED FROM PAGE 30

Editor's Note: The Railway Tie Association (RTA) continues to be a leader in the services it develops for railroad usage. In addition to industry leading seminars, this new software package provides an incredibly powerful tool for Class I and regional/short line railroads for planning and budgeting purposes. With accurate input data, railroads can accurately forecast and budget for the replacements either system-wide or by smaller track segments. In addition to these obvious benefits, the forecasts can be used by railroads that are seeking capital expenditure financing to provide an analytical model for the source for such funding. With TieLife™, RTA continues to provide tools designed to assist railroads in making the best decisions possible in maintenance planning so that tie life can be maximized with minimal cost.

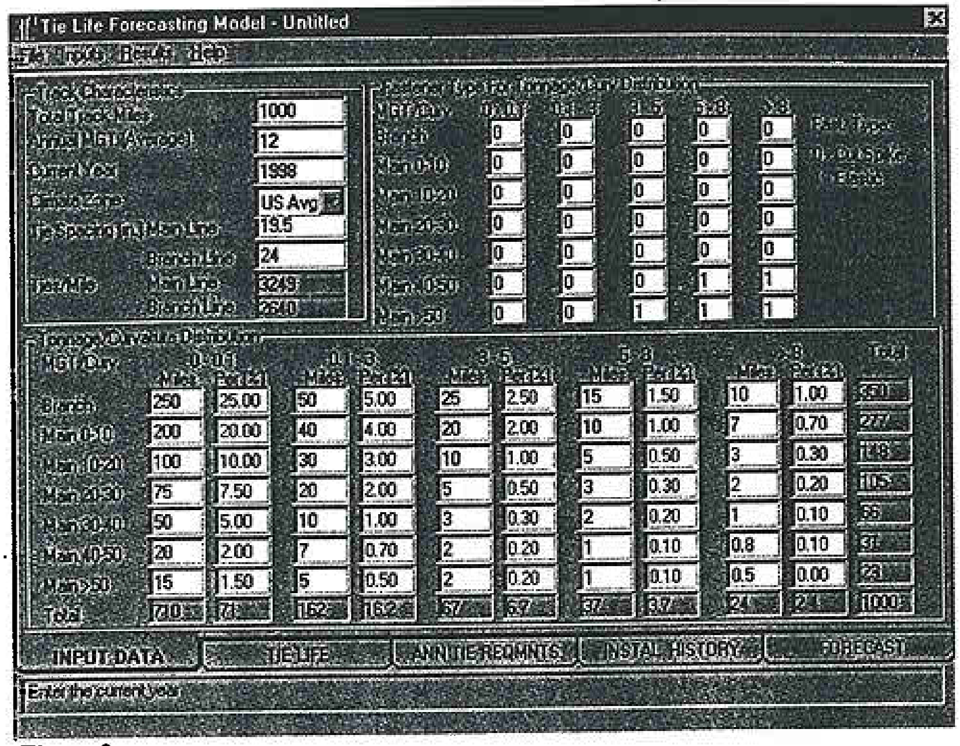

Figure 3

Special Report—*Timber Resources*

Lessons In *Hardwood* Forestry

A Conversation With Distinguished Scientist, Dr. Allan Houston

Editor's Note: This article is reprinted with permission from the October 1997 issue of Evergreen Magazine, *a publication of the Evergreen Foundation. Dr. Houston will be a featured presenter at the 80th annual RTA Convention, which will be held Oct. 7-9, at Callaway Gardens in Pine Mountain, Ga.*

Few forest scientists wear their humility quite as well as Dr. Allan Houston. But then not many have the good fortune to suffer the consequences of conceit so early in their careers.

He recalls his "brush with self-importance," suffered only months after the Ames Plantation hired him 17 years ago.

"I arrived here, fresh out of college, believing I had been everywhere and done everything, or at least read about it," he chuckles. "It is a wonder someone didn't shoot me."

Thankfully, no one did, for Dr. Houston has gone on to become a brilliant scientist and forestry educator.

Today, he is chief forester and wildlife biologist at Ames, a non-profit forestry and farming operation east of Memphis, Tenn. At 18,558 acres, it is the largest land resource research facility in the University of Tennessee system.

It took a forest to teach Dr. Houston two critically important lessons he had not learned in forestry school: humility and patience.

"I arrived here believing clearcuts were a certain cure for whatever ailment a forest was suffering," he recalls. "And I was determined to prove the point."

In a matter of months, he got his chance, directing the clearcutting of 100 acres of bottomland hardwood. He even insisted on doing some of the cutting himself.

"I remember standing in the middle of my decision after the cutting was done," he recalls. "It was dead quiet, it was ugly and it was mine. Believe me, it was a humbling moment in my life."

In the years that followed, Dr. Houston never stopped worrying about the correctness of his decision. Filled with doubts, he repeatedly begged colleagues to revisit the site with him. Many did, counseling patience.

"I was looking for reassurance anywhere and everywhere," he recalls. It finally came, not from his colleagues, but it came from the forest itself.

"To my amazement and great relief, a prosperous young forest emerged from the empty ugliness where I once stood in stunned silence," he says. "Equally surprising, all of the desirable tree species are present. In another 16 years, there will be sawtimber on the site. The science is firm."

Though science has vindicated Dr. Houston, he feels no genius, "only a profound sense of revelation. I had spent a great part of my young career telling everyone who would listen that forests are dynamic. And do you know what? They are."

The experience taught Allan Houston a lesson he has never forgotten.

"My youthful arrogance had been cut to the ground, just as certainly as the trees in my clearcut," he recalls. "Over time, I came to understand the grief and sense of loss the

CONTINUED ON PAGE 36