TRANSALTA UTILITIES REPORTING SYSTEM—A MANAGEMENT TOOL[1]

by Sig Guggenmoos

Abstract. A reporting system which provides budget status, unit costs and productivity measures can be an invaluable tool for utility managers. It permits managers to identify cost effective practises and anomalies occurring at the division level. It can expose gradations in productivity not detected by field observation. The savings from one identified poor practise may well pay the annual cost of operating the reporting system.

Résumé. Un système de rapports qui procure des états budgétaires, des coûts unitaires et des mesures de productivité peut être ou outil inestimable pour les directeurs d'entreprises de services publics. Il permet aux dirigeants d'identifier les coûts pratiques réels et les anormalités se produisant au niveau des divisions. Il peut exposer la progression de la productivité non détectable par les observations sur le terrain. Les économies d'une mauvaise pratique identifiée peut payer le coût annuel d'opération du système de rapports.

TransAlta Utilities is an investor owned utility located in the province of Alberta. TransAlta provides two thirds of the province's electric energy requirements. About 300,000 customers are served directly. Our service area covers roughly 83,000 square miles supported by 57,700 miles of distribution lines and 6,700 miles of transmission lines. Within TransAlta the responsibility for the maintenance of distribution and transmission line rights-of-way is split. The discussion centers on the Distribution Line Clearance (DLC) group.

In 1984 TransAlta engaged Environmental Consultants, Inc. (ECI) to undertake an inventory of the vegetation conditions on 38,400 miles of owned overhead distribution lines and 16,900 miles of distribution line owned by 112 Rural Electrification Associations (REA). The REA's are essentially farmer cooperatives who contract their line maintenance work to TransAlta. ECI was also asked to review our DLC practises, organization; staffing requirements and to use the found inventory and growth rates to make budget projections.

Simply put, ECI found we had a system of hotspotting which varied in effectiveness with the Division budget, interest, and commitment to line clearance. They forecast budgets for the next 12 years categorized under TransAlta-owned and REA-owned lines. Specific recommendations regarding organization, staffing and operating practises were made.

Most of ECI's recommendations were implemented. Program control was centralized with the formation of the DLC group. Budgets were substantially increased. Staffs were increased. Work began to be undertaken in grids, the smallest grid unit being a township of 36 square miles. Grids were chosen over circuits because of potential future links with our automated drafting and facilities management system. A couple of significant points were rejected. Rather than to provide notification of work to landowners, we chose, after a legal review, to contact each landowner personally to obtain a written consent. Although, the number of staff and the organization were accepted, the educational requirements for the positions were not.

It had been TransAlta's intention to accept the recommendation of going on ECI's TRES program. Due to the decision to obtain written consents and the fact of having to correctly bill work in accordance with line ownership, we needed to be site specific. This level of detail necessitated some redesign of the TRES program. TransAlta time shared this enhanced TRES program for 2 years after which it was purchased on a permanent lease basis. During the development phase, the cost of the system was about 2% of the annual budget. The current costs are about 1%.

The database for the reporting system stems from the daily Line Clearance Reports. On it, crew activities are coded ie. top trims, removals 6"-12"dbh, consenting, travel, etc. to the nearest 15 minutes. There are about 45 activity codes. Any given crew would use about 15 codes of which 6 would be routine.

1. Presented at the annual conference of the International Society of Arboriculture in St. Charles, Illinois in August 1989.

The reporting system generates a variety of reports ranging from reverse contractor invoices on a bi-weekly basis through crew effectiveness ratings to ad hoc reports. A bi-weekly budget update is used interactively with a PC spreadsheet for scheduling crews to a zero budget variance. DLC has three budgets to balance. With this combination of system reports and PC spreadsheets annual budget variances have been below 0.25%.

The real strength of the TRES program is the ability to generate unit costs and productivity information at various levels of detail. This information can be called up by Department, Division, work order number, contractor, foreman, township and location number. Although, requests for specific information may result in any given breakdown being useful, in general, we produce unit cost and productivity reports monthly at the Department and Division level and quarterly sorted by contractor and foreman. The Division Coordinator also receives monthly a Detailed Activity Report Analysis which states by Division and Department, unit costs, ratios such as cost per manhour, % of trees trimmed vs. % of trees removed, time utilization, performance and effectiveness. This permits the DLC Coordinator to compare the current month unit costs and ratios to the past 12 months history, other Divisions and the Department average. The Coordinators are asked to consider all possible factors to understand any significant variance. Reasons for variance have run from weather influences, changes in crew personnel or equipment, poor or exceptionally good organization on our part, to simply, inaccurate recording of units by crews. These reports also allow those responsible for the system level to monitor changes or anomalies occurring at the Division level. Perhaps more signficantly, the Coordinators see on a timely basis the impact of operational changes they've introduced. This serves to reinforce the necessity of system wide consistency in practises and activity code interpretations.

Foreman effectiveness, which is run quarterly, is graphed and then distributed through the Foresters to the Coordinators and contractor supervisors. The contractors are seen as cooperators in working towards our objectives. We believe they can only react to what they know. All have responded favorably and indicated they view the effectiveness graphs as a valuable tool.

The following are some specific observations gleaned from the reporting system, particularly the effectiveness graphs.

(See Figure 1) We have noted that when a new foreman is started his effectiveness is about 70% for the first 3 months. At an average crew cost of $200,000 per year this learning curve represents additional costs of $15,000. This finding stresses the need to schedule work in a manner which stabilizes the contractor work force.

(See Figure 2) The learning curve was confirmed when a foreman began a new work type we call premow. Premow is the clearing around obstacles and removal of large trees to prepare the site for mowing. When the slash crew foreman became a premow foreman, effectiveness was about 70% for 3 months.

(See Figure 3) TransAlta was approached by a contractor to add a fifth man to their premow crews. This was introduced gradually but expanded to other crews based on the positive feedback both from our staff and the contractor. Both were convinced that the additional man more than paid for himself. Our first run of effectiveness graphs indicated otherwise. When the fifth man was dropped there was a 20 to 40% increase in effectiveness. Since both our staff and the contractor believed the fifth man to be justified, it must be concluded that changes of 20 to 40% in effectiveness are not readily identifiable by visual assessment in the field. Had we not seen the below average effectiveness of these crews on the graphs we would have approved all 6 of the contractor's premow crews to run indefinitely with a fifth man. The cost of these crews over 1 year would be $200,000 X 6 = $1,200,00. At 70% effectiveness the cost of an equivalent volume of work would be ($100/hr)/.70 = $143/hr; $143/hr X 200 hrs X 6 crews = $1,716,000. This difference of $516,000 represents about 4% of our annual budget.

(See Figure 4) As would be expected, the quality of contractor supervision also impacts on effectiveness. A Coordinator's concern about inadequate supervision was responded to in October 1987 by the appointment of a new supervisor.

The impact on productivity was immediate with the crew in the example reaching the Department standard effectiveness in 2 months. What the numbers don't show is that there was also a marked improvement in the quality of the work. The fact that good or poor supervision can be, to a degree, quantified is a lever in ensuring good supervision is provided. The contractor supervisors eagerly await the effectiveness graphs because the graphs identify or confirm for them problem crews and show the improvements in crews chosen for focused attention in the last quarter. The fact that the graphs can make the supervisors look good to us and their management is a point not missed by them.

(See Figure 5). With the introduction of the grid program, we quickly grasped some benefits such as decreased travel, increased productive time and more supervision time. The effectiveness graphs show a marked difference between grid crews and hotspot crews. Figure 5 represents a crew which works on a hotspot list submitted by districts until complete. The crew then switches to grid work until another substantial list of hotspots is compiled. The effectiveness of 70% appears to be typical of hotspot work on our system. It is rather frightening to think what the cost of our program was previously when all crews were essentially hotspotting. If we examine the trim crews alone we find the following:

20 trim crew yrs X $160,000/ crew yr =	$3,200,000
hotspot 3.5 trim crew yrs @ 70% Effectiveness +	$ 240,000
Current effective cost	$3,440,000
Before grid program effective cost: 20 trim crew yrs X $160,000/crew yr/.7 =	$4,571,429

The additional cost of the trim crews alone on a hotspot system would be $1.1 million per year. Since the budget is set there would really be $1.1 million less trees trimmed. Should we fall off the grid program and revert to hotspotting, in 3 years we would be fully one year behind. It is apparent with such a progression that hotspotting perpetuates itself.

(See Figure 6) This graph shows all trim crews in a Division to be 30% below the Department average. The Coordinator questioned TransAlta's contribution to this effectiveness rating. Upon discussing operational practises with his Forester it was found there was no comprehensive hotspot list submitted by districts. Rather, hotspots trickled in on an almost daily basis. Crews were pulled off the grid weekly to do hotspots but no single crew was identified as the hotspot crew. Hence, time utilization was below 70% whereas the norm is 80 to 85%. Further, the trim crews were doing all necessary slashing. The impact of this does not show in effectiveness but can be seen in the unit costs. On a trim crew equipment costs of $44/hr are spread over 2 men. On a 4 man slash crew equipment costs are only $8/manhr. Obviously trees removed by a trim crew are going to be more expensive. Following the discussion a slash crew was assigned, hotspots were accumulated until there was at least one week of work and one crew was designated as the hotspot crew. The effectiveness of the Division's trim crews rose to 95%.

(See Figure 7) For the reporting system to be useful it is imperative that the input be accurate. When the effectiveness graphs were introduced, a concern raised by the Foresters about wide variability around the Department standard became graphically evident. A concerted effort was made by the Foresters between March 1987 and March 1988 to ensure all TransAlta and contractor staff used one and the same interpretation for activity codes and that the units were accurately reported. This effort was rewarded by a

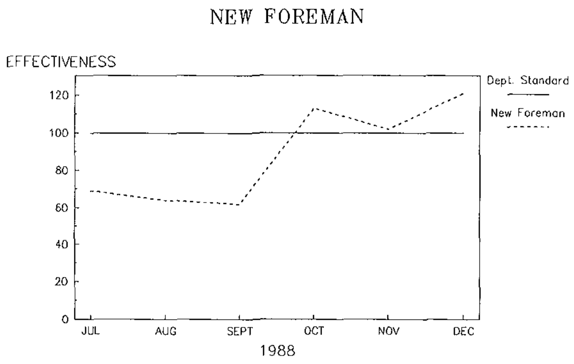

Figure 1

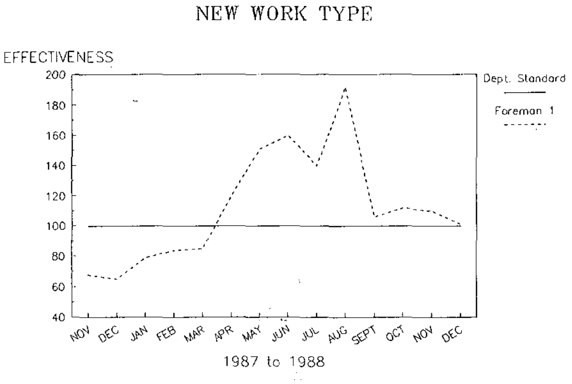

Figure 2

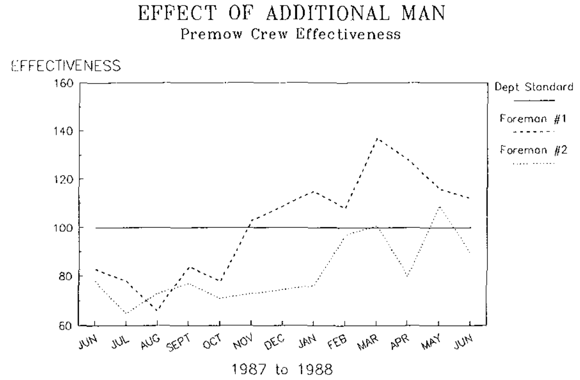

Figure 3

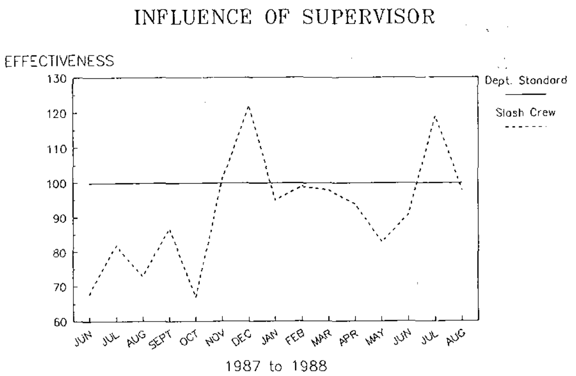

Figure 4

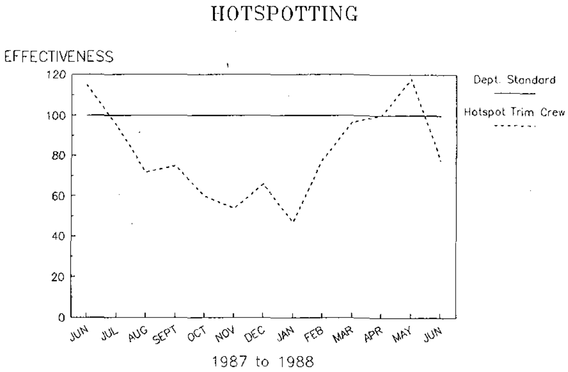

Figure 5

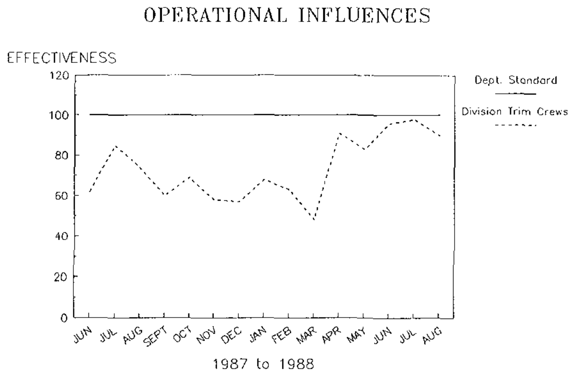

Figure 6

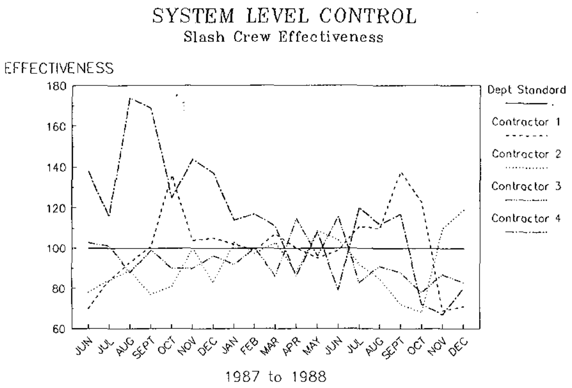

Figure 7

substantial reduction in variability. Since that time, other priorities have emerged. Without the Foresters' guidance, restricting interpretations of codes to one standard, ensuring operational differences are identified and standardized and that regular inspections to verify the accuracy of unit counts are carried out, the variability has resurfaced. For the measurements to be truly comparable variability needs to be minimized. Figure 7 implies this requires centralized control. Further, there is an ongoing requirement to exercise this control as variability spread widely 4 months after the Foresters left the field.

We see the reporting system as an invaluable tool. It has permitted the quantification of a hotspotting program; the impact of poor supervision, turning a work force on and off, operational variations, utility supervision; contractor strengths. It has highlighted the need for centralized control. Generally, it has put information into our hands on a timely basis. We are thereby empowered to make decisions which mean more trees handled per dollar, advancing the first cycle towards completion.

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Abstracts

JACOBI, W.R. 1989. **Populus problems.** Am. Nurseryman 169(2):48-55.

Foliage diseases can reduce the aesthetic value of Populus species. Though leaf diseases look bad, they are not generally life-threatening to trees. This article describes five of the most common leaf spots found on Populus species: Marssonina leaf spot; ink spot of aspen; leaf and shoot blight; leaf rust; and Septoria leaf spot. Most native and hybrid poplars are susceptible to one or more of these diseases. My discussion of the disease's symptoms and life cycles is followed by some general tips for control.

ANONYMOUS. 1988. **The effects of ozone on landscape plants.** Landscape Contractor, October, pp 8-10.

When pollutants combine in sunlight, the resultant ozone is very unstable and rapidly causes oxidation on such varied surfaces as metals, paints and landscape plants. Ozone enters the stomates. Ozone is a very strong oxidizer, so it affects the membranes of the cells within the leaf whose stomates it has entered. When these membranes are damaged, they die. Some plants have much better ability than others to resist ozone because their stomates are smaller, so they are better able to keep the toxic gas out of their inner workings.