

Louisiana Transportation Research Technical Assistance Report



Analysis of Traffic Signal Work Backlog in Louisiana

Special Studies/Planning Group
July 1995

LTRC

Louisiana Transportation Research Center

Sponsored Jointly by the Louisiana Department of Transportation and Development and Louisiana State University

Analysis of Traffic Signal Work Backlog in Louisiana

Technical Assistance Report
LOUISIANA TRANSPORTATION RESEARCH CENTER

July 1995

by

Burl Dishongh, Ph.D., P.E.
LTRC Research Engineer
Special Studies/Planning Group

Louisiana Transportation Research Center
4101 Gourrier Ave.
Baton Rouge, LA 70808

Overview

The Traffic Services Section of DOTD is responsible for the installation and modification of all state-owned traffic signals. The annual budget allocated to Traffic Services for in-house traffic signal work averages \$2.5 million.

Traffic Services annually receives an average of 370 new traffic signal work orders. With their staff engineers and 24 field workers, they are able to complete approximately 370 work orders. Thus, Traffic Services is currently staffed to just keep up with their ongoing workload. However, for the past several years, Traffic Services has ended the year with a list of approximately 530 traffic signal work orders it was not able to act upon.

A review of Traffic Services' traffic signal work records reveals the source of the backlog. During the 1980's, the department experienced personnel cutbacks and hiring freezes that caused the number of field personnel to drop from 40 to 24. Simultaneously, the backlog of work orders tripled to over 500. Another major factor in the backlog problem was a lack of funds for materials acquisition and ladder truck maintenance during the late 80's. The funding problems have since been addressed, thus leaving Traffic Services with several refurbished ladder trucks and the capability of sending out an additional 10 traffic signal field crew workers.

The purpose of this study is to review Traffic Services' work orders and budget data, and to project how the backlog of signalization work could be eliminated.

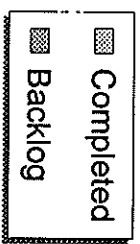
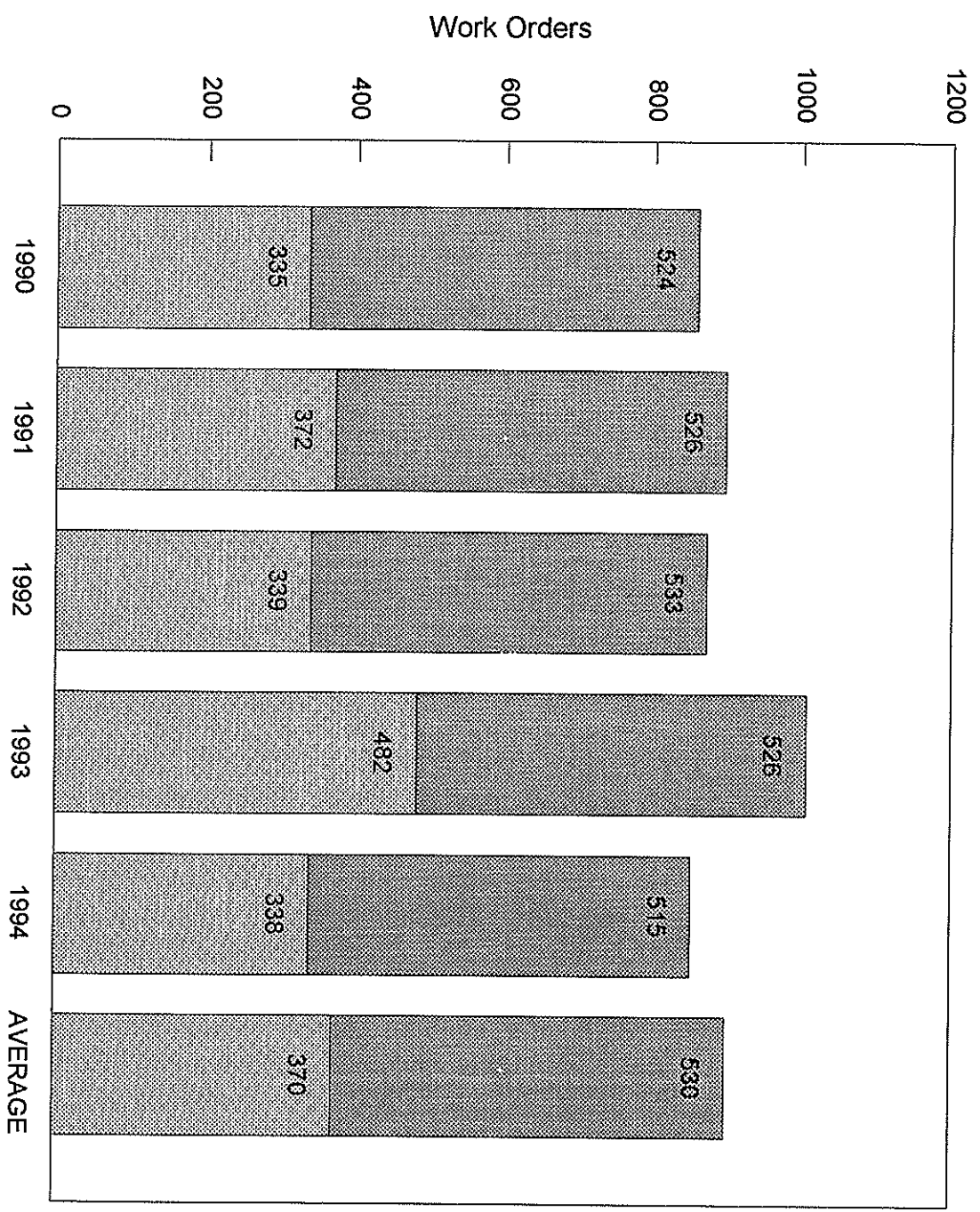
Traffic Signal Work Orders

The following graph shows the number of traffic signalization work orders handled by Traffic Services for each of the past five years. The annual workload is shown as the number of jobs completed and the number of jobs not done by the end of the year. The data for each of the past five years is consistent, and the five-year average provides a good description of the typical annual Traffic Services' traffic signal workload.

As shown in the graph, Traffic Services is faced with an average of 900 work orders every year. Typically, Traffic Services will complete 370 work orders. Traffic Services is annually keeping up with the number of new work orders (370), since the number of work orders not completed by the end of each year -- the work backlog -- is consistent at 530.

In addition to its annual volume of 900 traffic signal installation and modification work orders, traffic services personnel must annually review approximately 16 signal permit requests and coordinate the installation or modification of 40 traffic signals included as part of various DOTD road construction contracts. Faced with this workload and shortage of field crews,, it has been difficult for Traffic Services to process its work in a timely fashion.

Five-Year Traffic Services Signal Workload



Cost Assumptions

The data indicate that the average cost to complete a traffic signal work order is

$\$2,500,000 \div 370 \text{ jobs} \approx \$7,000 \text{ per job.}$

For the backlog to be eliminated in accordance with the Section's current in-house work procedures, the additional required money is

$\$7,000 \times 530 \approx \4 million.

If the signalization work is to be let by private contract, the additional required money is projected to be

$\$4,000,000 \times 2 \approx \8 million.

The multiplying factor of 2 is suggested by various sections within DOTD and is based on years of past DOTD contract work experience.

Options to Eliminate Backlog of Signal Work

The 370 work orders currently handled by Traffic Services each year should be processed as usual. For the safety and convenience of the traveling public, the backlog of 530 work orders must be reduced. By eliminating this backlog, a more timely response to work orders, permit requests, and contract plan reviews will be made possible. With the backlog under control, the department should be able to expect a response time of 180 days for traffic signal work requests.

For the remaining 530 signalization work orders, the following options suggest themselves as viable means of eliminating the backlog:

- 1) Increase Traffic Services' workforce and supplies budget by a total of \$4 million over the next four years. Workers hired with these increased funds will pose only a temporary increase in the overall DOTD employee count, since there is a consistently high attrition rate of traffic signal field crew workers.
- 2) Package the 530 backlog jobs into one or more private-sector work contracts to be completed within three years at an estimated cost of \$8 million.
- 3) Place a moratorium on all in-coming traffic signal work orders for two years.

In order to ensure that the department is doing everything possible to respond to traffic signal work in a timely manner, a management study of Traffic Services' traffic signalization work program is being conducted by university management experts. The study should be beneficial in identifying methods to optimize the traffic signalization work process. The study is focusing on

issues such as increasing municipal responsibilities related to traffic signals within their corporate limits; maintaining strict adherence to traffic signal warrants; assessing work order priorities; materials and equipment procurement; problems encountered by the increasing complexity of installation of computer-based equipment; field worker turnover; etc.

Discussion

It is projected that within four years from the present (1996-98) the backlog could be eliminated by in-house work, and within three years (1996-97) the backlog could be eliminated by contract work. These projections are based on information obtained from DOTD management personnel experienced with traffic signalization work at both the in-house and private contract levels.

The estimated budget outlay needed to eliminate the backlog may be too low, since many of the backlogged signal modification work orders may turn into full-replacement work orders, costing many times more than a modification job. It is important to note that in all likelihood a modification job is more likely to turn into a full-replacement job when done under contract work because in-house personnel have acquired considerable expertise in maintaining old equipment with small budgets.

Noting that it will cost \$4 million and require four years to eliminate the backlog in-house, while contracting the backlog work will cost \$8 million and require only three years, it is apparent that contracting the work will yield results 33% faster than in-house, but the work will cost 100% more.

A moratorium on incoming work orders would allow Traffic Services field crews to eliminate the work backlog. In order for this option to be effective, the 370 new work orders being generated each year must not be allowed to be stockpiled by the Districts and suddenly passed on to Traffic Services at the end of the moratorium. Because there are many emergency and routine maintenance work orders that cannot be ignored, a 'pure' moratorium is not totally possible.

Recommendation

The difficulty of acquiring new funds and new state personnel authorizations at this time is recognized. Nevertheless we must recommend that \$4 million be appropriated to the DOTD Traffic Services Section over the next four years to eliminate its backlog of 530 traffic signal work orders. A staff increase of ten field workers will be required to perform this backlog work. Failure to address the backlog problem will continue to hamper the ability of DOTD to respond to traffic signal needs in a timely manner.