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PERFORMANCE-BASED SPECIFICATIONS FOR PORTABLE VEHICLE
CLASSIFIERS BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION

Speaker: Curtis Dahlin
Minnesota Department of
Transportation
Authors: James Muske, et al.
Minnesota Department of
Transportation

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**PERFORMANCE-BASED SPECIFICATIONS
FOR PORTABLE VEHICLE CLASSIFIERS
BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION
(Mn/DOT)**

by James Muske and Curtis Dahlin

Abstract

The procurement of traffic counting devices which precisely meet the specifications (and needs) of the state agency has sometimes been a difficult task. The accuracy and reliability of the equipment has sometimes been such that the user has secured equipment which does not perform as well as expected or desired.

Historically, specifications have primarily dealt with the physical characteristics of the equipment. There was little or no discussion of the accuracy which was expected. Mn/DOT now writes specifications which are performance-based. The latest specifications for portable vehicle classifiers detail the accuracy required.

These specifications also call for two periods of testing which are called pre-award and post-award testing. Extended test periods such as this along with well defined accuracy requirements enable Mn/DOT to precisely know the accuracy of the equipment.

PERFORMANCE-BASED SPECIFICATIONS FOR PORTABLE VEHICLE CLASSIFIERS BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION (Mn/DOT)

State and other governmental transportation agencies have been using machines to count traffic for many years. These machines have almost exclusively been secured by the competitive bid process. Differences in that process exist from state to state. However, there is also much commonality between them. The procurement of traffic counting devices which precisely meet the specifications and needs of the purchasing agency has often been a difficult task. The accuracy and reliability of the equipment has sometimes been such that the user has secured equipment which does not perform as well as expected or desired.

This paper discusses the key elements in the specifications which the Minnesota Department of Transportation (Mn/DOT) has used to purchase portable vehicle classifiers. Many of these elements can be used in specifications for other types of traffic monitoring equipment.

Historically, specifications have primarily dealt with the physical characteristics of the equipment. There was little or no discussion of the accuracy which was expected. There was also no discussion of basic machine performance.

The key change in specifications is that Mn/DOT now requires what is termed pre-award and post-award testing. There are specifications which apply to the pre-award phase, to the post-award phase and to both. Each phase has different hardware and software requirements. The accuracy requirements are the same for both phases.

Summarized very briefly, in the pre-award testing phase, Mn/DOT requests that the vendor with the lowest bid who indicates compliance with the specifications ship Mn/DOT four off-the-shelf machines to test. If all four pass the tests, then this vendor is requested to ship the whole order within 60 days. Mn/DOT then randomly selects machines to thoroughly test. If a minimum of 90 % of those which are tested pass, then the contract is awarded to this vendor. If there are problems with the machines either in the pre or post-award phase, Mn/DOT can, at its discretion, request the vendor to correct the problem.

If the machines fail either the pre-award or post-award tests, they are returned to the vendor. The vendor with the next lowest bid who indicates compliance with the specifications is then notified and requested to send four machines for testing and the process is thus repeated.

There are several reasons for setting it up in this manner.

- 1) **Mn/DOT secures for itself the opportunity to evaluate the counters during both the pre-award and post-award testing without committing itself to a contract and then having to cancel if it does not work out.**
- 2) **The concept of testing a few (4) machines initially and then many machines later allows Mn/DOT to structure and better handle the work involved in testing. It is felt that if four machines perform satisfactorily, then additional machines of the same model using software modified to meet MN/DOT's needs will also likely perform fine.**
- 3) **It is presumably to the vendors advantage to ship a small number of machines for pre-award testing as opposed to modifying large number of machines when ultimate acceptance of the machines has not yet been determined.**
- 4) **The purpose of the pre-award tests are primarily to test the machines for functionality and accuracy. Mn/DOT specifies that the machines be off-the-shelf, that is a standard product of the vendor. Because neither the vendor or Mn/DOT know at that time whether the tests will be successful, the vendor is not required to modify the machines to meet specifications unique to Mn/DOT, eg. a specific data format.**

There is one advantage for each party at this stage. The advantage to the vendor is that he does not have to invest his resources to modify his product to meet Mn/DOT's ultimate specifications. The advantage to Mn/DOT is that it will not, somehow, find itself participating in R & D but should be working with machines proven in the marketplace.

- 5) **When the post-award test phase is reached, even though it is likely that the tests will be successful, both the vendor and Mn/DOT have extensive work to do --the vendor will comply with post-award specs and Mn/DOT will extensively test many machines.**

Another important part of the specifications is that the machines must be able to pass a bench test where a Mn/DOT technician will examine and test the internal electronics of the classifier. A key part of this test is the departments air pulse generator. This generator is normally used as a tool by Mn/DOT to identify counters which need repair. The count recorded by the classifier should match the set number of pulses emitted by the generator. Field testing each unit can be prohibitively time consuming which is why a simple bench test device is so important.

The accuracy test specifications are meant to strike a balance between the departments needs and what is achievable with these machines from a practical standpoint. Comparisons are made to both manual counts and to existing data collection sites which have been proven reliable in past testings. The accuracy required is:

- 1) Total vehicles must be within plus or minus 4 %.
- 2) Cars, pickups and motorcycles when summed must be within plus or minus 7 %.
- 3) 5 axle semis must be within plus or minus 7 %.
- 4) All other trucks when summed must be within plus or minus 10 %.

The minimum number of vehicles in the sample must be 1000 total vehicles with 100 trucks (types 4-1 3) and 50 5 axle semis (type 9).

Finally, tests are conducted at locations which have low speeds (30 MPH) and at those which have high speeds (60 MPH). The machines will be used to collect vehicle classification counts at both types of sites, so it is vital that they be able to perform at those sites.

At this point in time Mn/DOT is in the midst of pre-award testing of Portable Counter-Classifiers and will not have any definite results until after the spring 1996 testing period. However, so far everything looks optimistic and we expect this type of contract to yield equipment that has proven accuracy and reliability.