

## A HIGHWAY IS BORN

**Earthmovers . . . Bulldozers**

**Stone . . . Concrete . . . Blacktop**

**Road Pavers . . . Men with tools . . .**

When these elements are skillfully blended and activated, a highway is born. But before the first spade of soil is turned, a vast amount of planning experience and administrative effort has been brought into action . . . planning conferences, surveys and traffic counts, designing, researching, testing and so on.

The birth of a highway begins with careful planning studies. It is simply not possible to use rule-of-thumb or make an educated guess in deciding whether a highway is needed. Disclosure is made through such factors as traffic sampling, traffic counts, and automatic traffic recordings with results carefully studied by engineers. Using up to date procedures, they can project the yearly traffic increases in a given area and plan a highway for the future.

The birth of a road takes place with the work of traffic interviewers gathering data for the traffic flow maps. Traffic and planning sections are activated working on both surveys and studies which include urban area traffic, sufficiency ratings, rural road inventory, highway speed and accident analysis, traffic on secondary roads, traffic on primary roads, the possible need for highway relocations and the accruing benefits to highway users from the projected highways.

Once this information has been gathered and digested, signs of preliminary activity appear by men with tripods and levels who carry out such varied types of work as locating buildings and trees, recording detailed topography, finding reference points and

recording factors concerning alternate routes.

Sometimes private firms are called into consultation. The State Highway Department may find it necessary to make aerial surveys of the area, or private engineering firms may be asked to engage in some of the initial work. Highway planners will want to study the aerial photographs to obtain the best highway locations.

If there is some doubt about public reaction, the Highway Department initiates public hearings. People are given the opportunity to express their opinions freely and these opinions are taken under advisement. Notices of these hearings are advertised in advance in the newspapers and other media. They are held before final designs for the highway are complete. Other ideas are solicited from the public and often prove to be of great and lasting benefit.

During fiscal 1964, fifteen public hearings concerning proposed highway projects in various communities were held with an average attendance of about 150 persons per meeting.

### **MATERIALS AND RESEARCH SECTION**

Next to appear on the site of the proposed highway is a crew taking soil samples. The samples are for the Materials and Research Section of the Department which functions both as an investigator of original soil and foundation conditions and as a quality control check organization on construction materials and related highway work phases. They also perform tests and observe field performances concerned with the buildings of highways.

To keep current with the ever increasing demands for higher

quality, this unit attends testing meetings, highway research sessions and other related organizational conferences. Materials and Research Section also conducts a school for job control on soils and other materials to enable construction divisions to take over field control. Specifications and testing methods are revised when necessary.

An extensive program in research on new products and methods of modifying or improving existing materials was also conducted by the M & R Section. This year, additives to cement, bridge deck protective coatings, joint sealant material and asphaltic concrete mixtures were explored for feasibility. Higher quality material at an economical cost is the major goal of the Section.

During fiscal 1964 the unit carried out the following tests compared to the 1963 figures in parenthesis: asphalt, 3875 (3523); hot mix gradation, 1063 (740); fine aggregate, 608 (698); coarse aggregate, 3107 (2722); soil analysis, 14,129 (8882); soils (deep borings) 17,011 linear feet (12,052); borrow pits, number tested, 818 (638). All information is evaluated and engineers prepare the plans. The Highway Department has data on traffic problems, knows about both volumes and weights and has detailed ground or aerial surveys. The design will now depend on the results of traffic data analysis from which traffic engineers can project the number of present and future vehicles that will use the new highway.

### **DESIGN SECTION**

In fiscal 1964 the Design Section was given an assignment of substantial proportions and respon-

sibility to prepare design plans for thirty-three road construction projects, many small projects involving suburban streets and intersection improvements, and a long list of dirt roads.

Although the section's staff was seriously reduced by resignations and layoffs due to the delay in passage of necessary financial legislation, by the end of the year the number of employees returned to normal. Design was started on a substantial number of projects, and bids were received on several projects financed by the recent legislation. All projects for which funds were available from previous financing were awarded. During 1964 the Department awarded a total of thirteen road construction projects for which designs were primarily prepared by this section. These projects had a total estimated cost of \$4.8 million.

The Road Design Section was also responsible for acceptance of suburban streets into the state maintenance system. Private developers are required to construct all streets to Department standards and must submit construction plans and performance bonds for approval before construction proceeds. Plans and bonds covering 17.76 miles of streets in thirty-six developments at an estimated construction cost of \$1,376,687 were approved in fiscal 1964. The Department accepted a total of 13.91 miles of completed suburban streets into the maintenance system. (See Table I in Appendix.)

#### **RIGHT OF WAY**

The closest contact between the State Highway Department and the citizen is the area of the Right-of-Way Division. This is particularly true when a project is ready

for the State's acquisition of property for building a highway. The relationship between the Department and the property owner is both direct and personal because it involves the purchase of private property for public use.

Last year the Department was able to obtain 90 percent of the needed parcels of right of way by negotiating with property owners and without initiating legal proceedings. Negotiations begin with plans for right-of-way acquisition by the Department. If this procedure fails, due either to a hesitance on the part of the owner or any other factor, and following a sufficient lapse of time, a letter is sent the owner under the signature of the Chief Right-of-Way Officer confirming the offer made by the negotiator and requesting the owner's acceptance within a specified time limit. Notation is made that failure to comply leaves no alternative to the State but request for condemnation. The Right-of-Way Division is always on the alert to deal most equitably with the property owner. This is evidenced when it is realized that less than one percent of the properties acquired had to be taken before the condemnation court.

Of particular interest are the results of a study conducted by American Association of Highway Officials relating to right-of-way procedures. This tabulation of responses from forty-six participating states indicated that Delaware acquired a larger number of parcels of land than did twenty-two of the reporting states.

Delaware has been honored by the states of Maryland and Connecticut by having been invited to sit as examiners in oral tests leading to promotions in their respec-

tive Right-of-Way Divisions.

The Department, faced with a great and ever-increasing volume of paper work, micro-filmed all of the deed records in reel arrangement. These records were placed in card jackets for more efficient filing and a printer viewer purchased for the central office. Jackets applying to the various division offices were distributed to their respective office and a viewer provided.

Total Right-of-Way Department expenditures were \$2,287,170.97 and the following matters processed: options executed, 1,088; releases executed, 128; deeds executed, 295; easement executed (permanent) 1,254; easement executed (slope) 34; easements executed (daylight corner) 216; agreements executed (trespass) 86; agreements executed (ditch) 139; barrow pits acquired, 2; roads closures, 3; condemnations posted, 81; condemnations settled out of court, 46; condemnations heard, 46; description written, 715; plats prepared, 455.

The Department created an Appraisal Section during 1964 to make its program even more effective.

According to estimates, this Section provided sixty percent of all appraisals for properties acquired with activities confined to less complicated problems. It is expected, with educational programs continuing, that next year the problems of the most difficult nature will be undertaken by staff appraisers.

#### **CONSTRUCTION SECTION**

The actual initiation of a highway construction project comes when the contracts are signed by the State Highway Department. This

*Asphalt laying machine.  
Design section.  
Soil testing on site.  
Right-of-Way engineers.*



involves the Construction Section whose primary function is to assist the Chief Engineer in control and administration of Department construction-related contract projects. It reviews and audits all reimbursement estimates to the contractor and acts as liaison between the division personnel and staff during the construction phases of each contract. It also assists in the review of all preliminary data prior to the recommendation being made for issuance of the official "Notice to Proceed with the Work."

Field engineers make frequent unscheduled trips to all construction projects in the State to review daily operations and inspect procedures. Construction contracts within the scope of the Department include highways, bridges, retaining walls, drainage structures, buildings, beach facilities and beach erosion restoration. (See Table II in Appendix.)

#### **UTILITIES SECTION**

As the program proceeds, it is necessary to have close cooperation between the Department and the utilities. This is the function of the Utilities Section. During fiscal 1964 the Section administered by the Utilities Engineer continued to maintain and improve its necessary close relationship with the various utility organizations, contractors, and consultants in the planning, estimating and removing of utilities because of road construction or reconstruction. The scope of these adjustments has attained major importance as a necessary component of reconstructing roads, streets and freeways throughout the State.

In 1964 the Utility Section, with excellent cooperation from the various utility organizations, pre-

#### **PUBLIC RELATIONS**

*The State Highway Department maintains close contact with the Delaware Citizen by providing current information concerning work being done and other related news through a variety of media.*

*Department administrators are among the most active proponents of public relations through their personal contacts with the public as well as by talks to groups and associations and by means of public hearings. A second method of providing public relations for the department is through writing specialists assigned to the Department by the various media. These writers attend regular and special highway meetings and are highly experienced in the complexities of the Department's activities. The third avenue for news dissemination is the Public Relations Department itself which provides information on a regular basis through news releases, brochures, displays, photographs and various writing assignments. It also serves as liaison between the Department administration and all other types of news agencies to provide accurate and significant information.*

#### **STATE TRAFFIC COUNTS**

*The Planning and Review Section has a regular yearly program for counting and classifying the various types of vehicles using the nearly 4,300 miles of Delaware roads. The objective of the project is to obtain reasonably accurate traffic volumes for all state maintained roads. Because it is impossible to count all road traffic every day, sampling techniques are employed. At some locations the traffic is counted continuously throughout the year. At others counts are made at least once every three years.*

## MUNICIPAL APPROPRIATIONS

There is annually appropriated to the fifty-one Delaware municipalities a sum equal to one per cent per gallon of State motor fuel tax collected on motor fuels sold within the State but not to exceed \$1,200,000. The municipalities use this money to make street improvements, maintain streets, provide traffic signals and signs, and other related items. The Planning and Review Section makes an annual inventory of streets in each municipality and prepares a list and maps for all eligible streets.

## UTILITY PERMITS AND FRANCHISES

A total of 1,422 permits were issued to various utility companies and commercial establishments for work performed within the right-of-way; 125 franchise and fifteen renewals were processed during the year. The Permit Section is furnishing full-time inspection on all in order that better compaction and resurfacing of shoulder areas may be obtained. The Department requires utilities to drive or bore under all roads when possible, reducing traffic congestion and complaints and not disturbing the roadway.

## ABSTRACT CONDEMNATION CASES

A valuable project was initiated by the Right-of-Way Division in the preparation of a bibliography of all condemnation cases conducted under the new Eminent Domain Law extracting from each case pertinent court rules, valuable testimony which has been upheld by the court, objections sustained and rejected and awards made. All will be assembled for easy and quick reference.

## NEW CASTLE COUNTY CONSTRUCTION

Miscellaneous projects completed during fiscal 1964 by the New Castle County Division included the following: construction of a dyke; repairs to platform scales, Troop 2; construction of four reinforced concrete masonry bridges; replacement of curb and gutter; three bridge repairs; erection of a Bailey bridge.

## NEW CASTLE CONSTRUCTION COSTS

The bid prices of construction projects for New Castle County during fiscal 1964 ranged from an approximate low of \$3,350 to an approximate high of \$832,847.80. Total cost of construction paid out during this period was \$3,116,988.40. An average of twenty-eight inspectors, using fifteen state-owned vehicles for transportation were employed to inspect and supervise construction. Of the twenty-eight inspectors ten were chief inspectors.

## NEW CASTLE COUNTY SURVEY

The survey section of New Castle County Division completed 105 miles of preliminary surveys and 80.28 miles of construction staking. The various types of preliminary surveys are: 29.56 miles of base line, 29.92 miles of detail, 23.47 miles of bench marks and 21.83 miles of cross sections with 26.6 miles of painting center lines. In addition there were eight drainage projects totaling 1.5 miles, eight property surveys and four borrow pits surveyed.

pared an estimate for the cost of relocation and removal of pipes, telephone lines, electrical transmission and distribution lines, railway tracks, sewers, poles and wires all necessary to complete the National System of Interstate and Defense Highways in Delaware. The estimated cost was \$7,471,827.

The Utility Section approved and processed estimates amounting to approximately \$1,330,000 for payment of adjustments and relocations to utility facilities on Interstate, Primary, Secondary, Urban and local State projects. The Section prepared forty-two utility agreements with utility organizations. It also processed franchises submitted by utility organizations to install facilities in State controlled rights-of-way as follows: New Castle County, 240 franchises, 65.358 miles; Kent County, 69 franchises, 79.143 miles; Sussex County, 70 franchises, 89.846 miles. Total, 379 franchises, 234.35 miles.

## BRIDGE SECTION

Modern highway building often involves spanning water or other obstacles. This type of work is the responsibility of the Bridge Section which serves as the designer and construction adviser on all structures advertised by the Department.

Basically a design group, the Bridge Section during the first six months of the 1964 fiscal year suffered severe losses in trained designers through lack of construction funds. As a result, this unit was reduced from eight designers to four by the time funds became available. Yet, with half the number, the Section had to prepare and advertise projects for one and one-half construction seasons to make up lost time. Additionally, it

was necessary to review consultants' designs, contractors' submissions, advise on constructions and make miscellaneous studies.

The Bridge Section serves as designer and construction adviser on all structures advertised by the State Highway Department including bridges, culverts, retaining walls, impoundments, water control structures, dams and beach protective structure.

In fiscal 1963-64 the Bridge Section participated in advertising non-interstate structures including twelve bridges and culverts totaling 568 feet in length, two bridge widenings, four mill-pond dams, one retaining wall, one groin, one major drainage project, and two bridge repair projects. This totaled \$786,422.42 of structures in \$3,572,602.62 of highway work.

For the same period of time, the Bridge Section participated in advertising interstate structures including ten bridges, one viaduct and four culverts for a total length of 7,175 feet of structures at a construction cost of \$11,523,476.70 in \$13,537,487.45 of highway projects.

When these significant accomplishments are added to the many other functions of the Bridge Section, this year appears successful despite the loss in manpower. It is estimated that five designers, with a minimum of three years experience each, are required to place the Bridge Section on a progressive path again. (See Table III in Appendix.)

#### **SPECIAL ASSIGNMENTS**

One of the duties of the Engineer of Special Assignments is to advise the division engineers concerning various plantings along the highways and to provide recommendations for locations for

new improvements of existing roadside rest areas. He also works closely with garden clubs and civic organizations regarding roadside beautification projects which they might wish to undertake.

At this point the preliminaries, or staff work, in connection with the projected highway have been completed.

With the advertising and receipt of bids, it becomes the duty of one of the State's four construction divisions to supervise the construction in accordance with plans which have been provided. The actual construction is done by contractors under the supervision of the State Highway Department Division officers.

The contractor begins clearing vegetation, buildings and other objects in the line of construction and right-of-way. Grading is done which may involve moving a hill, filling a valley or solidifying a swamp. The soil is then compacted to the required density to support the traffic road.

The next scheduled work entails completing structures for drainage, then building overpasses and underpasses. This involves paving on a sub-base of bituminous or portland cement in addition to surface drainage, and structures for embankment protection.

Just before the highway is ready for use, the necessary traffic signs and signals are erected. Barriers are installed where necessary as is the right-of-way fence. Lighting, landscaping and other improvements are provided.

Thus a highway is born to provide a safe, efficient, attractive method of connecting two or more points in space. From man's mind to drawing board to reality . . . it is now YOUR highway!



*Bridge under construction  
Frederica By-pass*

*Asphalt Distributor and  
Grader Bituminous Stabilization Operation*