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Final Report, State Financed Research
Project on Paints, Project No. 645135

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The title of this report does not imply the subject of this research is terminated. It is a summary of the work accomplished under the State financed project prior to its acceptance by Bureau of Public Roads as a Federal Research Project, "Coatings, Sealants and Pavement Marking Materials," HPR-PR-1(8), Item D-5-35, on July 30, 1970.

During the life of this project, many new paint products and coatings utilizing the newest in synthetic resin binders, pigments and solvents have been developed and successful specifications written by the Laboratory. This type of research on new and better coatings will be a continuing project because the chemical industry is constantly developing new and improved and sometimes cheaper paint raw materials.

The research program essentially comprised two phases:

(1) Investigation and development of new paints and improving existing paints in the Laboratory.

(2) Field trials and evaluation of new paints developed to determine if reduced costs of the products and/or better performance could be obtained prior to the preparation of specifications implementing the research.

Following is a summary of accomplishments under the State-financed project.

(1) A whole new primer system for use on inland bridges was developed using the new basic lead silico chromate pigment in lieu of the red lead type. This has resulted in many advantages, principally by providing equal durability at a cost of approximately one dollar less per gallon. This system has now been used statewide for about six years on inland bridges and on the San Francisco-Oakland Bay Bridge.

(2) A series of colored top coats (replacing aluminum paint) has been developed for use on inland bridges in accordance with the demands of the aesthetics program. The first, a green, developed in 1960, is readily recognized on the many overcrossings in the State.

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(3) The vinyl primers and top coats developed for use on coastal bridges have proven quite successful. The research on these systems was started in 1953. The Golden Gate Bridge and Toll Authority adopted one of our vinyl top coats. The Division of Highways has extensively used the vinyl system specifications developed by the Laboratory.

(4) The Laboratory redesigned all existing coatings in State specifications in a record six months time in 1966-1967 to comply with the air pollution control laws and regulations adopted by the Los Angeles County and Bay Area Counties Air Pollution Control Districts.

(5) A report was written in 1969 "Evaluation of Coatings on Coastal Steel Bridges, 16 Year Period" which received nationwide and worldwide comment and was accepted as an HRB paper which will be published in the Highway Research Record this year. The complete report published by the Materials and Research Department is an "encyclopedia", complete with evaluations, pictures and the formulas of the paint systems used.

(6) Conventional solvent evaporation dry type traffic paint has been a subject of research for many years by the Laboratory. Like many other paints previously and subsequently described in this report, development was underway long before any formal research program was in effect in the Division of Highways.

Currently the states of Alaska, Arizona, and Nevada use our conventional traffic paint specifications in addition to many cities and counties in California.

(7) In cooperation with a major national research and marketing organization, the Department has recently completed publication of an extensive performance specification for an instant dry flame spray powder traffic paint. This coating is used on crosswalks (where it literally dries to bear traffic in between signal light changes) and on highway legends.

This coating will result in considerable cost savings in manpower in addition to providing greater safety to the crews applying the material, as well as minimizing delays and inconvenience to motorists.

(8) A hot melt thermoplastic extruded traffic line coating was developed by the Laboratory in 1964 which was highly rated in the Research Contract Report No. 6401 dated October 1968 issued by the Georgia Institute of Technology and prepared for the Bureau of Public Roads and the State Highway Department of Georgia.

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(9) The Department has extensively (and is continuing to do so) investigated and evaluated zinc silicate coatings for spray application over blast cleaned steel. When properly applied these coatings provide equal or better protection from corrosion than galvanizing or any conventional paints using inhibitive pigments. The high zinc content coatings have the added advantage that finish coats of decorative paint adhere very well to them. The new 1970 (or 1971) Standard Specifications will list four of these paint specifications.

(10) One of our recent developments is a quick dry automotive lacquer which will allow equipment to be placed in service within an hour after application of the coating at 70°F and above. The actual dry time is 20 minutes. The cost per gallon will be about one half that of commercial brands.

(11) Three concrete curing compounds for portland cement concrete were successfully formulated, tested and are now incorporated in the Standard Special Provisions. This series of products will provide contractors with a choice of quality curing agents for pavements and bridges.

Conclusions

The object of research of the type described here is early implementation. We note that AASHO specifications lag and that if new paint formulations were adopted sooner, many other states could take advantage of new developments in technology. To speed the process of keeping AASHO specifications up to date (and incidentally more usable to us), we would recommend that the committee on paints and other related coatings consist of a small group of knowledgeable specialists who can evaluate new materials and take appropriate action immediately to include them in the latest AASHO publications. A family of old and new paints could be listed, thereby making it possible for individual states to use and encourage development of better products if they wish to do so, while at the same time allow the use of the "old standbys". By virtue of our membership in AASHO, we are in a position to and do try to keep AASHO paint specifications up to date. Because of the large cumbersome committees who must rely on further extensive communication with coating specialists for even minor details, progress has been slow, and impedes our adoption of AASHO specifications for California highway use.

The total cost of the State-financed project to July 1, 1970, was approximately $75,000 from the time accounting records of research were commenced in 1964.

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