

There is another type of patching that is very expensive and on which satisfactory results are seldom obtained. That is building a light oil mat one year and the next year trying to save the surface by doing a lot of patching. If the surface shows a large number of pot holes and much raveling, which in most cases is caused by a weak base, a lot of time and money could be saved by lightly scarifying the oil mat, adding some new aggregate, and applying a bituminous material. This should be thoroughly mixed in place. By doing this, you will increase the strength and get a uniform riding surface.

Rolling of patches is very important and should never be neglected, provided the patch is large. I have seen instances where much care and time have been spent to build a good substantial patch, only to have the roller man ruin the whole job by improper rolling when the temperatures were high. You will get bad results by rolling on bituminous surfaces when the bituminous material has not been given the proper time to become tacky.

A state, county, or city may construct a building costing a hundred thousand dollars. In most cases this building will receive the very best of maintenance and in making repairs the very best of materials and labor be obtained. A building, so maintained, will last many years. This same state, county, or city has only to build five or six miles of high-type road to have the same amount of money invested, but the road will get much more wear and tear than the building will. If the road received the same high type of maintenance as the building, we would see a great improvement in making repairs to the breaks in the surface.

Today the newspapers carry lists of motor accidents and fatalities. Quite a number of these accidents are caused by the motorist's hitting a bad break or hole in the road surface that has been neglected by maintenance forces. Good maintenance is not only valuable to the life of the surface, but also very valuable in preventing many serious accidents to the traveling public.

Probably no part of highway maintenance is more important than making the proper repairs to all types of road surfaces.

OVERHAULING AND REPAIRING HIGHWAY EQUIPMENT

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Much concern is shown over the requirements for materials and equipment for governmental units, but seldom is any attention given to the question of specifications for person-

nel. The specifications for a man may as readily and easily be outlined as any of the requirements of the U. S. Bureau of Standards for inanimate materials. This should be given particular consideration in the matter of employees in a highway garage and repair depot. The service required at these points is, in some measure, a sort of personal service, and the men selected to have charge of these matters should possess high mechanical qualifications and be executive-minded as well. A well-manned highway garage and repair station will relieve you of much of the grief of conducting a county highway department.

A highway garage and repair department building should be well lighted, and special attention should be given to heating and ventilation. You will make no mistake in requiring that the buildings be kept clean and orderly, and in this you will be doing the staff a service.

As to the equipment and machinery necessary to a unit of this kind, the following is a rather general list:

1. The repair-shop work-bench should be large and well equipped and so placed that the maximum amount of light is obtainable, and should have racks and shelves adjacent to it for the convenient placing of the tools generally used.

2. There should be a lathe equipped for general garage work. This lathe should not be less than eight feet long, and must have a swing not under sixteen inches. This size will hardly accommodate all of the articles brought in for repair, but it has been found generally satisfactory.

3. A power drill or two will be essential, as well as a screw press of sufficient tonnage for wheels, tires, and gears, and likewise a grinding lathe equipped with carborundum and sandstone grinders and brushing and polishing discs.

4. Certain large or special tools will be found necessary. Any mechanic worthy of the designation will have about all of the smaller tools needed. Lockers and cupboards for tool storage are necessary.

5. Cylinder-boring and grinding equipment will more than pay for itself, if your truck fleet numbers more than a dozen. This will be particularly true if you have to use this rolling equipment for a number of years, as we have been required to do. Some of our trucks have been in use eight years and have traveled nearly a quarter of a million miles. We found cylinder grinding and reboring about the only way to keep them on the road.

6. A blacksmith's forge and anvil are incidentals, but it is important to have on hand a complete stock of shapes and sizes in steel and iron. The cost of this material will be insignificant compared to the benefits derived from having it on hand.

7. By all means a garage for the overhauling and repairing of highway equipment must have an overhead traveling

crane or chain hoist capable of handling at least a ten-ton load, and there should be a couple of A-frame hoists of varying capacities.

8. There should be a space partitioned off for the storage of spare parts and accessories. Truck and tractor parts which may be bought locally need not be stocked, but not many of us are so fortunately situated and have to buy from supply stations some distance away. Do not be afraid to buy, within reason, of course, a large supply of the parts which require frequent replacement. If you fail to use them, some one in later years will find them useful, and the cost of a few extras is slight.

9. Gasoline, oil, and tires should be kept under separate lock. Gasoline, particularly, has a high evaporation percentage when not securely housed.

10. Battery recharging and repair equipment will pay dividends.

11. The installation of an oil filter will be a source of saving. The use of filtered crank case oil is becoming quite general, and is accepted as safe economy. I would suggest, however, that you take the trouble to consult an authority before installing the necessary devices.

It is well to have a day each week, preferably towards the end of the week, upon which trucks shall be cleaned and greased, and the oil changed. The small amount of time needed for this operation is unimportant, and the strict observance of this requirement will shortly become a matter of habit, and will likely become the largest single factor in keeping the equipment on the road in condition.

I favor a sort of military precision in the parking of trucks, tractors, and other rolling stock, when this equipment is put under cover. A couple of dozen trucks properly aligned in the garage at night is an inspiring sight. This simple device should foster a desire for neatness, despatch, and workmanship in your men, and perhaps in yourself as well, and will surely be a means of conserving space.

OFFICE HELP NEEDED FOR ADEQUATE RECORDS

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The keeping of records in the county road department is a very important operation and utmost care should be exercised in its handling.

From the state gasoline and license fee fund we get a sum of money to maintain our roads and bridges. This amount is determined by the population and mileage of our several counties, and quite some time ahead we know approximately