









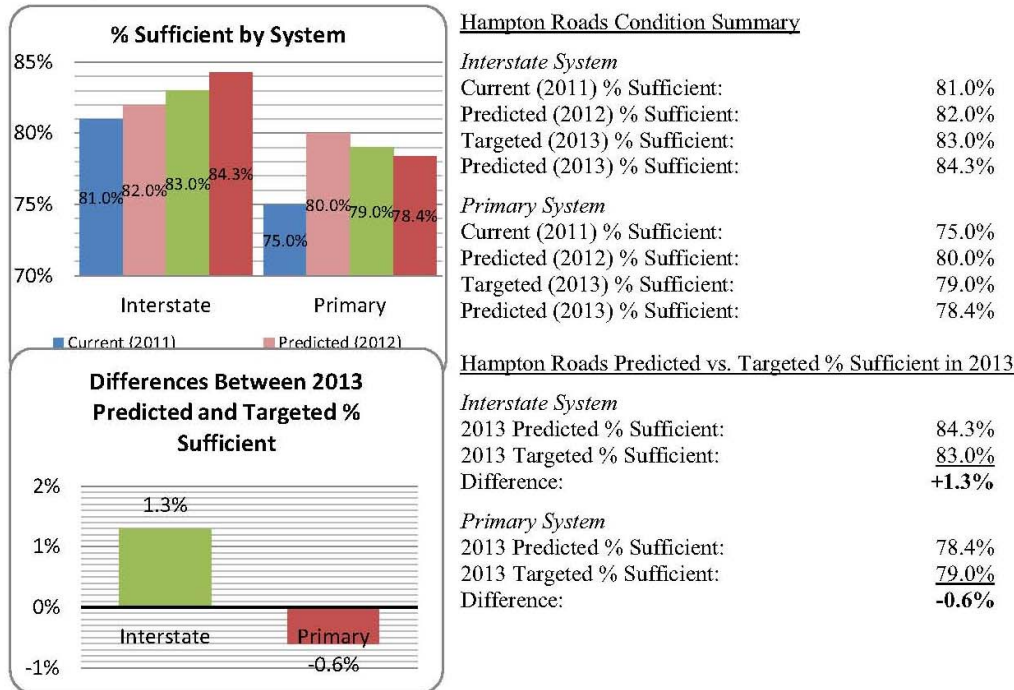






network, it is seen the target is exceeded by 1.3% but for the primary network the performance falls short by 0.6%. Such charts provide an easily understood guidance to plan for meeting the targets.

### Hampton Roads District – 2013 Predicted Performance

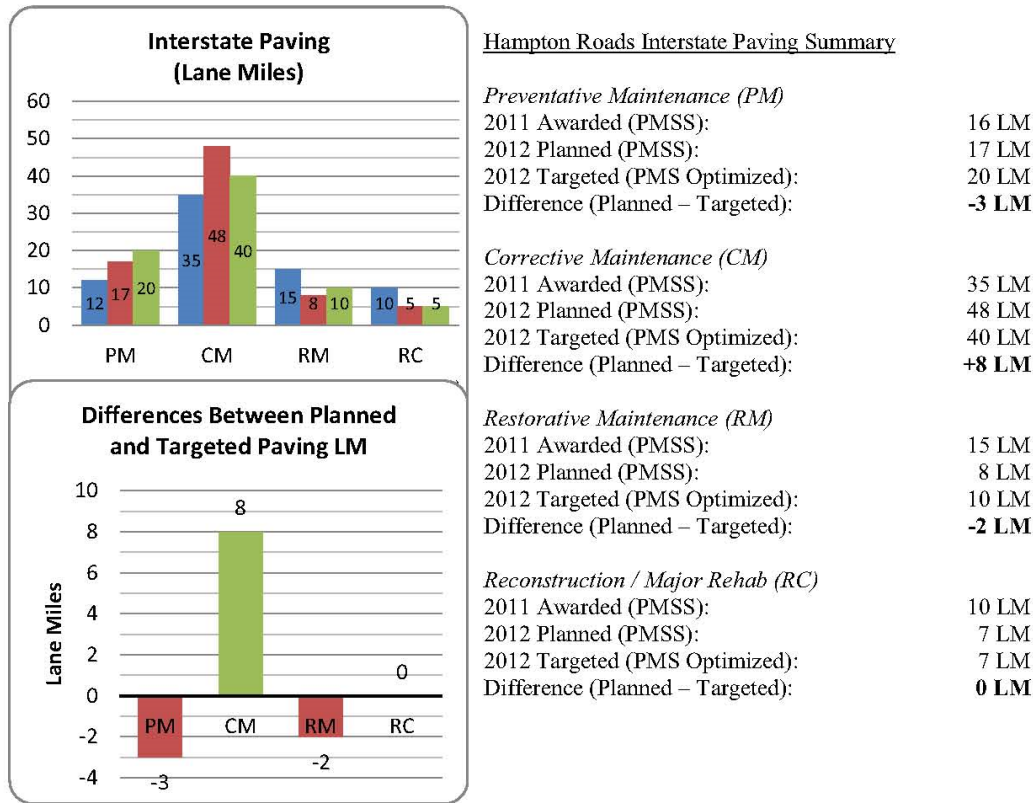


Given initial pavement conditions, expected deterioration and planned paving, Hampton Roads District **is** predicted to achieve its 2013 performance target of 83.0% of Interstate network in Sufficient Condition and **is not** predicted to achieve its 2013 performance target of 79.0% of Primary network in Sufficient Condition.

**FIGURE 3 Target and Expected Performance for a Maintenance District.**

An additional extract from a performance monitoring report which shows the targeted and planned lane miles of treatments under various categories for interstate and primary pavements is shown in Fig. 4. Here the upper portion of the figure shows the lane miles of various treatments awarded for execution in 2011. Also shown are the planned lane miles of work and the target lane miles for 2012. The difference between the planned and target lane miles are shown in the lower portion of the figure. It is seen that for the interstate, the planned lane miles under the corrective maintenance category exceeds the target by 8 lane miles. The planned rehabilitation/reconstruction work matches the target lane miles. However, the planned lane miles fall short of the targets under preventive and restorative maintenance categories by 3 and 2 lane miles, respectively.





Given planned 2012 Interstate paving, Hampton Roads District:

- **Is not** predicted to achieve its 20 lane mile paving target for Preventative Maintenance on the Interstate system.
- **Is** predicted to achieve its 40 lane mile paving target for Corrective Maintenance on the Interstate system.
- **Is not** predicted to achieve its 10 lane mile paving target for Restorative Maintenance on the Interstate system.
- **Is** predicted to achieve its 7 lane mile paving target for Reconstruction / Major Rehabilitation on the Interstate system.

**FIGURE 4 Target and Planned Lane Miles of Treatment for a Maintenance District.**

**Final Targets**

In July, the finalized unit costs of various items constituting the pavement treatments under various categories are available. Therefore, all the expected inputs that go into treatment determination for the network are available in the finalized form. These include the pavement condition data for the year, the budget allocations for the upcoming paving season, and the unit costs of various items of treatments. Consequently, the final performance and paving targets are determined as no more changes are expected to the inputs. Any changes occurring beyond this time period are expected to be rare. The planned M&R treatments are tracked at every stage of target determination.

**Tracking of Projects**

After the final targets are set in July, the planned M&R projects are tracked on a more frequent basis. Based on previous planning, the districts are finalizing the treatment projects from August through November. The process of frequent tracking of projects at this stage allows for course corrections in the choice of projects to reach the established targets. By November, the final project lists are established and the tracking process provides one more chance to make changes before the projects are advertised.

## RESULTS

The results of performance monitoring with the data from 2012 are shown here. Initial baseline targets were published in May 2013. These targets were the initial step that allowed the districts to start preliminary planning for paving in the following calendar year. These targets were developed using PMS optimization analysis, which used 2012 condition data, predicted pavement deterioration using the deterioration models within the system, and determined proposed paving based on the allocations published in April 2013. At this point, the districts were not expected to have planned work ready, since this report is intended to be a guideline for future planning.

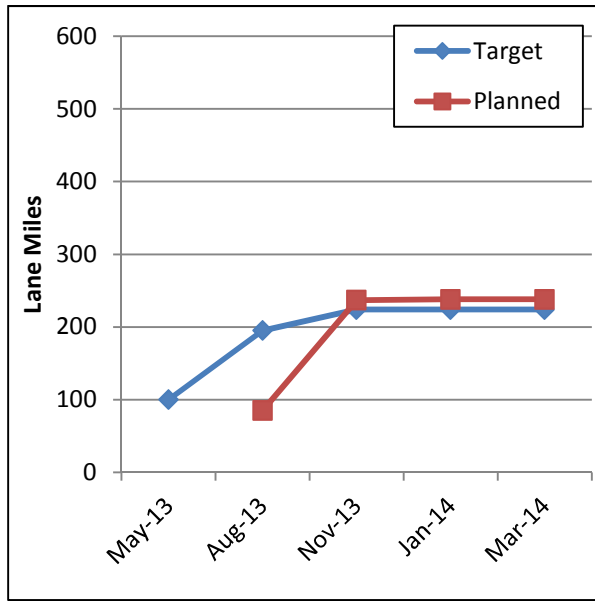
In August 2013, the targets were re-run with new condition data that was made available for 2013. There was also an influx in funding for reconstruction projects on the interstate, which resulted in a drastic increase in RC lane miles for the August target. Districts planned work in August 2013 based on the initial targets published in May, plus extra work based on the reconstruction funding that was made available.

In November 2013, the districts received further supplemental funding and the targets were again rerun. The districts responded to the changes in targets and funding by adjusting their planned lane miles accordingly.

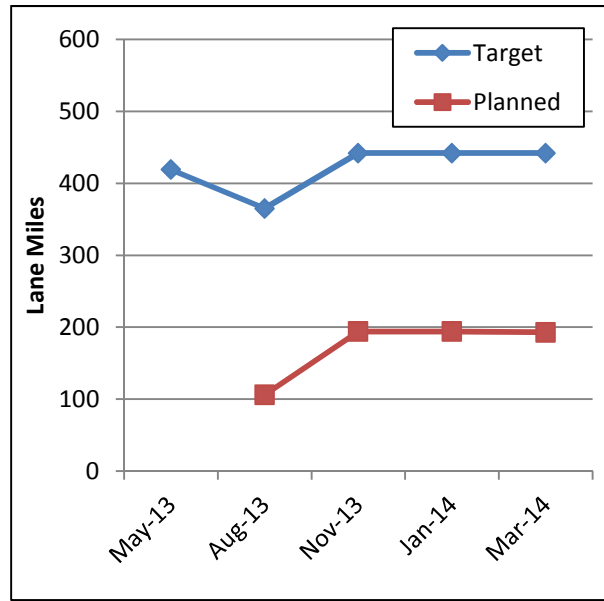
In January and February 2014, both the targets and the work planned by the districts remained stable. At this point, the districts finalized their planned paving for the 2014 construction season.

These trends in target lane miles and planned lane miles are shown in Figure 5 for Interstate pavements and Figure 6 for Primary pavements.

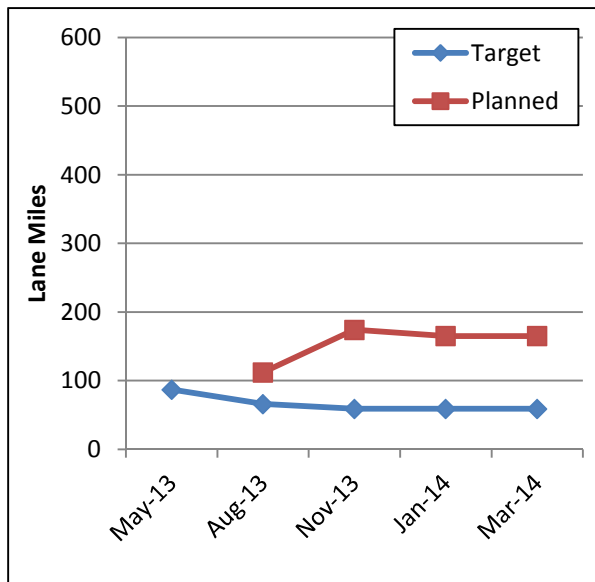
The expected percent sufficient values based on target lane miles and planned lane miles were also obtained for each milestone report. These values changed based on the changes in target lane miles and work planned by the districts, and these trends are shown in Figure 7. As a final step of the performance monitoring process, project level treatment selections are validated through the use of detailed distress, traffic, surface age, and structural condition information.



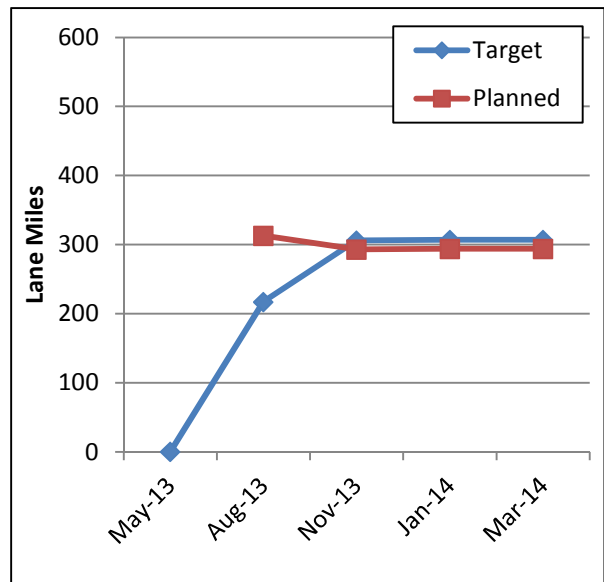
(a)



(b)

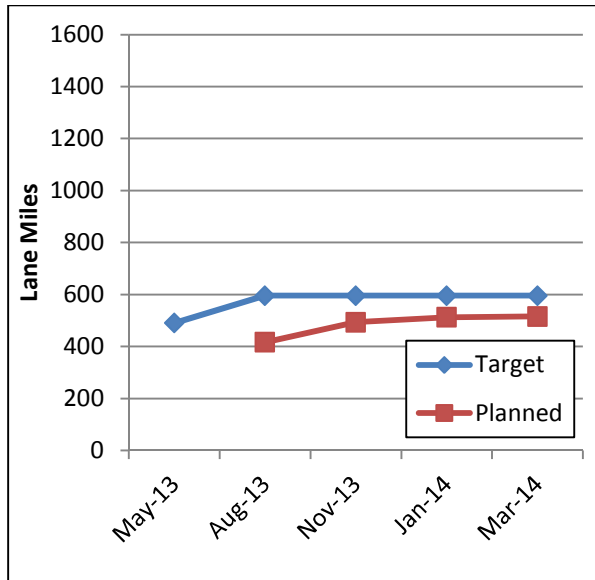


(c)

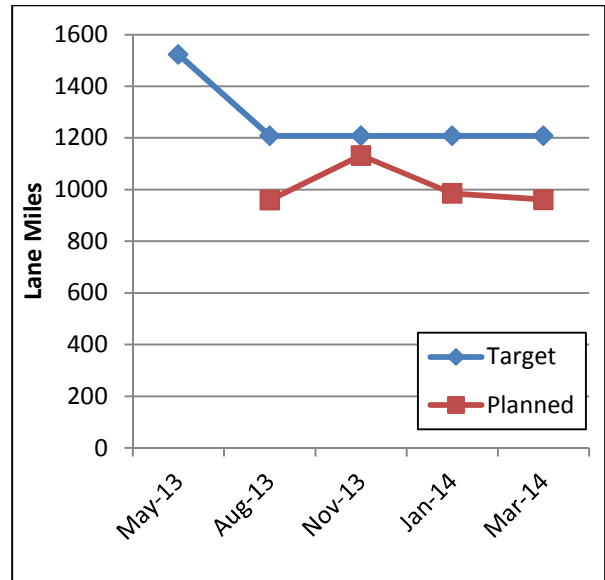


(d)

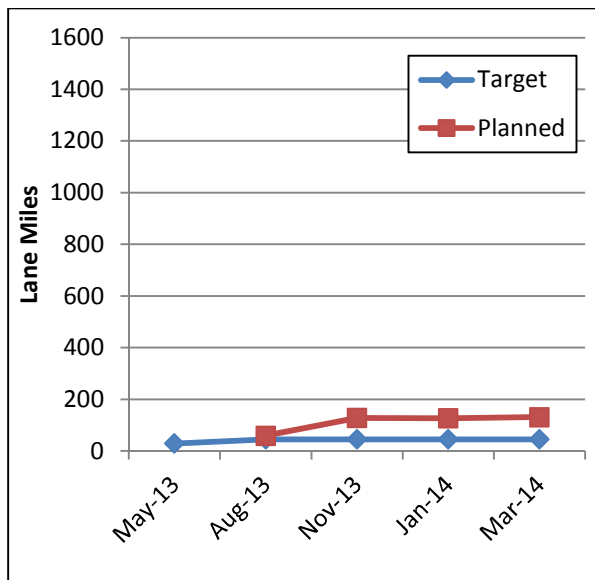
**FIGURE 5 Interstate Target and Planned Lane miles for (a) PM, (b) CM, (c) RM, (d) RC.**



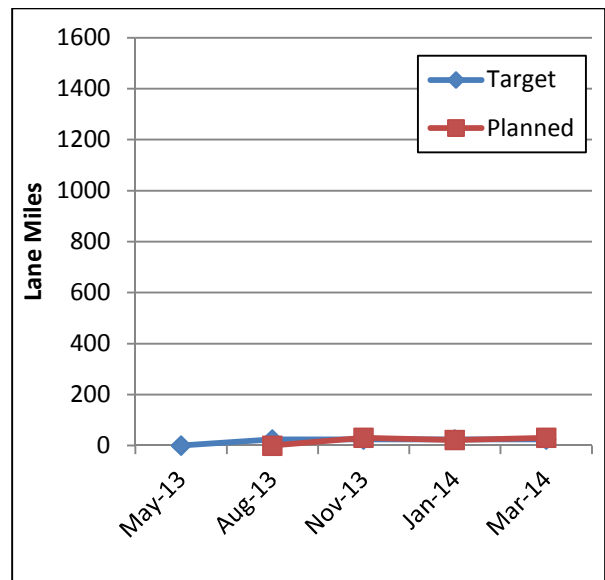
(a)



(b)

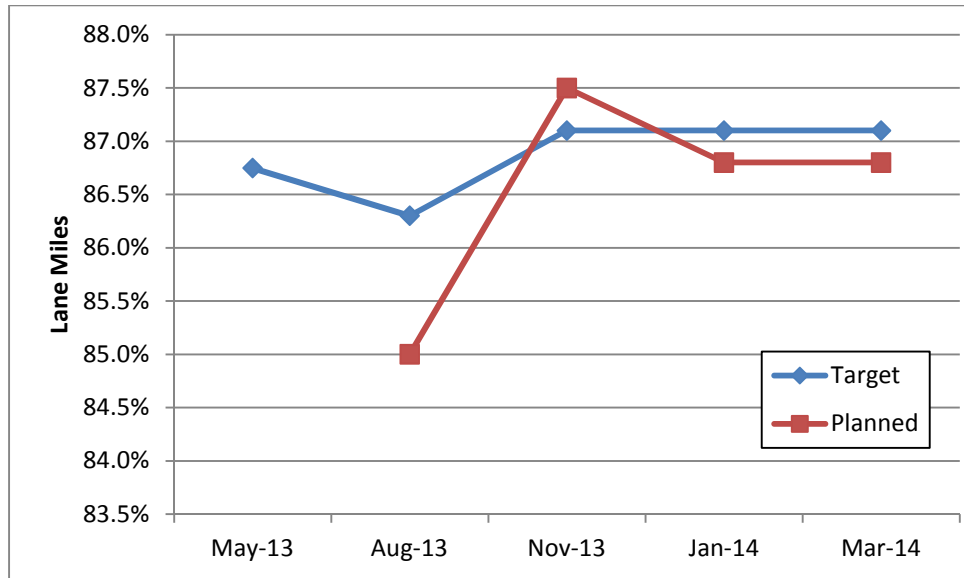


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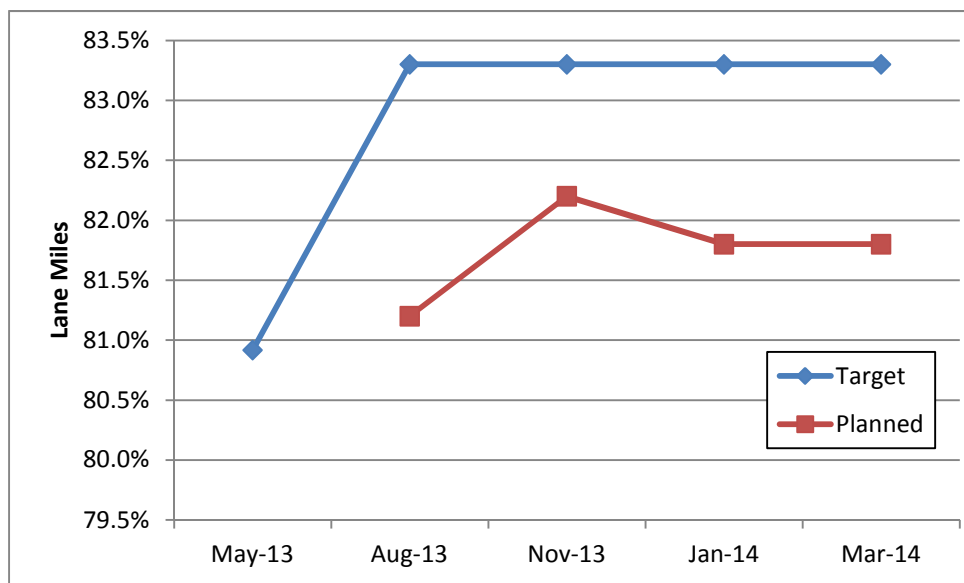


(d)

**FIGURE 6 Primary Target and Planned Lane miles for (a) PM, (b) CM, (c) RM, (d) RC.**



(a)



(b)

**FIGURE 7 Percent Sufficient for (a) Interstate Pavements and (b) Primary Pavements.**

**CONCLUSIONS**

A performance monitoring process is presented here that aids in the development of an M&R strategy for the pavement network. Depending on the time of the year at which the network treatments plans begin, expected performance reports are developed that take into account the treatment plans developed until that point of time, and provides guidance for further development of the plans for the paving season under consideration. The reporting intervals vary from as long as a quarter year in the initial stages, to once a month at the later stages of treatment

plan development. A sample report is presented that shows the details of the monitoring process, and provides an indication of the needed changes.

Results from the monitoring process presented here show that the M&R plans progressively improve toward meeting the defined network goals. Establishment of a performance monitoring process has helped in insuring that the network level objectives are met with respect to the maintenance of the roadway network. For this purpose, a well-defined dynamic analysis process, monitoring procedure of the choice of treatments, consistent reporting procedures, and appropriate time intervals for monitoring have been established.

## REFERENCES

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