

2007 National Traffic Signal Report Card

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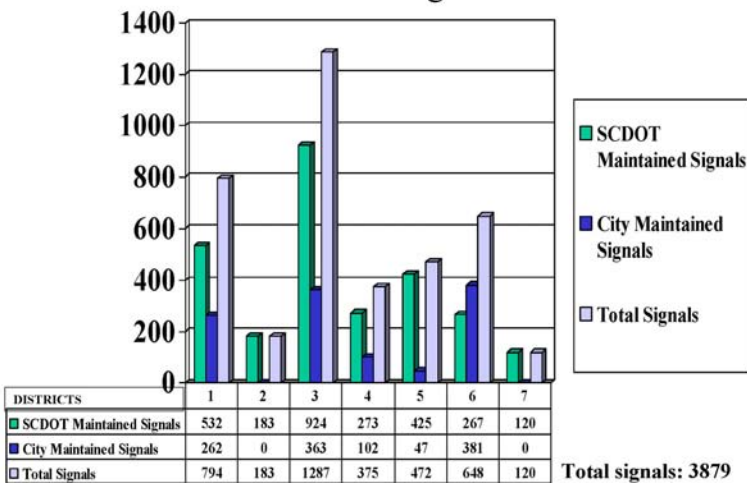
In 2007, the National Transportation Operations (NTOC) performed a comprehensive survey of the state of the nation concerning traffic signal issues this past year. *NTOC is comprised of transportation experts including the Institute of Transportation Engineers (ITE), the American Association of State Highway and Transportation Officials (AASHTO), the American Public Works Association (APWA), the International Municipal Signal Association (IMSA), ITS America, U.S. DOT–Federal Highway Administration (FHWA) and many other organizations.*(from executive report) This was a follow up study to one performed in 2005, and the national grade improved slightly from a ‘D minus’ to a ‘D’. This small improve is not a big surprise considering only two years between surveys and the lack of dedicated funding and focus on traffic signal management. For those of us involved with traffic signals, we know there are too few people, too few tools, and very little funding. The national report clearly describes the issues and is a document that I would recommend all local and state traffic engineers to read. Both the technical report and the executive summary are available on line at <http://ite.org/reportcard/NTSRC%20Exec%20Summary%20final.pdf> .

Individual agencies were ranked as well and SCDOT’s ranking has been a ‘D’ for both the 2005 and the 2007 Traffic Signal Report Card. We do anticipate a better grade in future surveys as we are making strides in the area of signal management and retiming. Our current grade is not indicative of the capability of the signal staff at SCDOT, but rather indicative of the lack of funding and resources to make needed improvements. The report card covered six main areas, management, signal operation at individual intersections, signal operation in coordinated systems, signal timing practices, traffic monitoring and data collection, and maintenance. Following is a brief overview of SCDOT’s goals for improving in the area of traffic signals in SC.

Signal Management –Although SCDOT has always had expertise available to manage traffic signals and signal systems, including District Traffic Engineers, District Signal System Engineers, District Signal Superintendents, Headquarters staff (Operations, ITS, e Signal Standards committee) Traffic Engineering Management decided to restructure headquarters Traffic Engineering to have one team dedicated to traffic signals and traffic signal systems in 2006. This group was named Traffic Signal & Systems and consists of 6 engineers, 1 communications manager and 1 technician. Carol Jones heads up this group at SCDOT. This focused approach to signals in SC is intended to improve our signal management efforts. The main goal of this group is to establish and maintain signal timing coordination for all SCDOT signal systems statewide on a continued basis.

The following graphs show a bit of information gathered in accomplishing the inventory of signals and systems in SC.

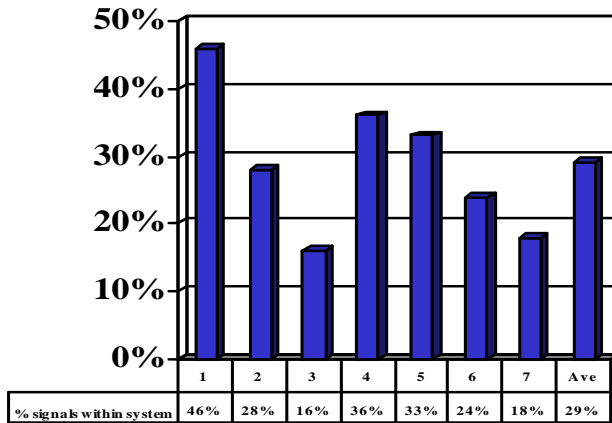
2006 Number of Signals in SC



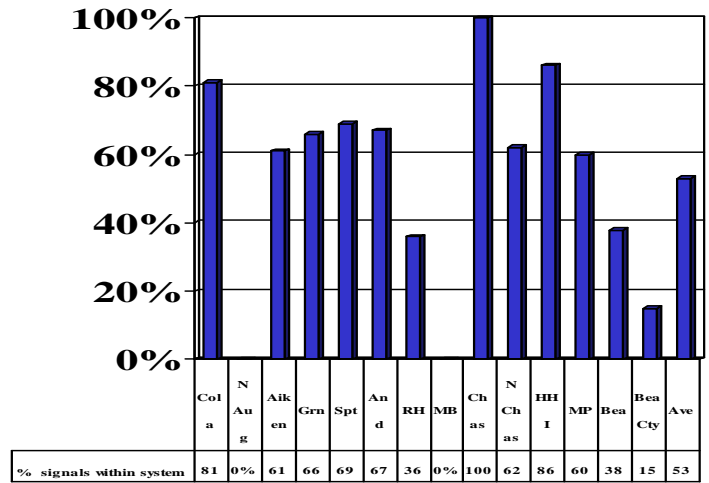
Signal Operation at Individual (Isolated) Intersections

–HQ Traffic Engineering at SCDOT has had a Traffic Signal Optimization Program (TSOP) for many years whereby signals were evaluated for safety and operational concerns and optimized. The annual goal was 40 signals per year and District Traffic Engineers determined which signals would be part of this program. These signals were typically isolated signals however some systems were optimized under this program as well. With approximately 2300 isolated traffic signals in SC, including those maintained by local governments, over 450 signals would have to be retimed each year to meet the goal of retiming on a 5 year cycle. A method of dividing up this work between HQ, the Districts, the capable local governments and consultants will be developed to meet this goal.

% of SCDOT Maintained Signals w/in a Signal System



% of Locally Maintained Signals w/in a Signal System



Signal operation in coordinated systems - There are just over 200 signal systems in SC, with approximately 175 maintained by SCDOT. The average SCDOT system size is 5 signals, while the average system size for locally maintained systems is typically larger.

Many of the systems in SC ideally should be timed more frequently than the 3-5 year recommendation, and TS&S is in the process of obtaining the District’s recommended retiming frequency for each individual system. Then a plan will be developed to divide up this work, again using available resources at HQ, Districts, local governments and if funding is available, consultants.

Funding is actively being pursued to promote signal retiming, as the benefit to cost ratio can be as high as 40:1. Three of the 10 Metropolitan Planning Organizations (MPO) in SC have identified signal system projects with one of the MPO’s allocating a set percent of the guideshare to Signal System projects. The SCDOT Commission recently approved a \$2M program for Statewide Signal Systems including funding for retiming and equipment upgrades. Expected benefits are reduced congestion, improved progression, improved safety and reduced energy consumption due to new LED signal heads, improved pedestrian guidance, updated technology, and improved signal management through the use of cameras and communications.

Signal timing practices - TS&S is in the process of developing standard practice for performing signal optimization. Many systems that are on a frequent retiming cycle simply need field adjustments and minor split and offset changes. Field observations during peak hours indicate the need for minor adjustments or for a full retiming study, known as a TSOP (TSSOP for systems) study. A TSOP study would involve obtaining traffic counts, reviewing signal and timing plans, before and after field studies, developing Synchro models for various timing plans and field implementation/fine tuning with District Signal personnel. A standard report is developed for each study for District review and concurrence prior to implementation.

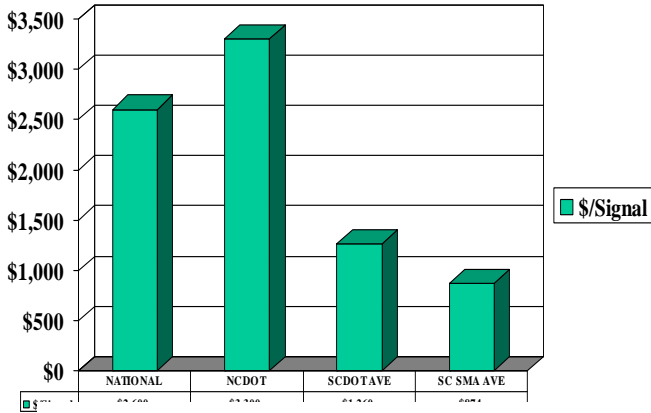
Traffic monitoring and data collection

Although SCDOT has a wonderful network of traffic monitoring cameras along interstate routes, we have a real need for placing more cameras along our signal system corridors. TS&S is in the process of developing a priority list for systems in need of cameras. With cameras, a strong fiber network and communications system is needed to transfer video back to the Signal System operators desktop.

Maintenance

Maintenance is one of the areas that need the greatest attention, due to the lack of resources currently available. SCDOT ranks well below the National and neighboring state's averages in maintenance budget allocations. Currently, less than 1% of the total maintenance funds are allocated for signal maintenance. At SCDOT there is not a separate budget for maintenance, new installations and rebuilds, so in addition to SCDOT ranking low in maintenance dollars available, new signals and rebuilds also come out of the already low budget. TS&S recommends separate budgets for new installations and rebuilds from the signal maintenance budgets. Additional funding is needed in the area of signals.

Comparison of \$/Signal



SCDOT also ranks well below the number of signal maintenance employees needed per signal. ITE recommends a ratio no greater than 31 signals per technician, and the SC average is 46 signals per technician. Two of our Districts have over 60 signals per technician, double the recommended rates. Our District signal maintainers also must cover several counties which indicate a need for spacing out our resources more effectively.

Another challenge is work force development and retention. The job of the signal technician has evolved from mechanical and electrical skills, to include computer/software/communication type skills. The salary available for signal maintainers in SC has not kept pace with the demands of the job. A signal technician is required to work in all types of weather, during all different times of the day and

The benefit to the motoring public for a great signal maintenance program is well worth the cost. Well maintained signals will enable engineers to optimize capacity to the maximum limit. Poor maintenance of detection devices (loops, pedestrian buttons, and video detection cameras) can result in unacceptable queuing during peak hours in a normally well operated signal system. The technology available to engineers can not be fully utilized if our signal maintenance staff is not given the appropriate manpower, proper tools and funding needed to maintain signals and systems effectively.

In summary, SCDOT is writing a vision for the future of signal operations in South Carolina and is hopeful that the necessary resources will become available to make the vision a reality.