

# NCDOT Transportation Operations Manual Implementation



By North Carolina Department of Transportation

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## Benefits Statement

NCDOT's adoption of the Transportation Operations Manual (TOM) has provided a structured framework that serves as the foundation for how NCDOT leaders and practitioners optimize transportation operations activities. NCDOT aims to leverage the TOM as a tool to continuously improve incident response times, streamline operations, and standardize processes. These efforts will help to save lives with safer roadways and reduce costs through improved resource utilization. NCDOT's TSMO team facilitated interactive training to foster engagement and to equip and empower staff to utilize the TOM in their daily operations and to plan for future improvements.

## In this case study you will learn:

1. How NCDOT uses the TOM to embed best practices in traffic operations.
2. How NCDOT uses creative methods for team training and engagement.
3. How NCDOT has used TSMO improvements to enhance safety, efficiency, and cost-effectiveness across transportation projects.

## BACKGROUND

The North Carolina Department of Transportation (NCDOT) is a leader in transportation innovation, maintaining the second largest roadway network in the US. Its Transportation Systems Management & Operations (TSMO) Unit supports traffic operations across 14 divisions, with six Traffic Management Centers (TMCs) responsible for safe and efficient travel in North Carolina. These TMCs use over 500 message signs and 1,400 cameras to monitor road conditions, and partner with Incident Management Assistance Patrol (IMAP) to make over 60,000 stops annually. Harmonizing these resources, systems, and agencies at scale has been a testament to the effectiveness of TSMO strategies. The NCDOT TSMO strategic plan aims to apply TSMO principles through collaboration and continuous education while guiding NCDOT's evolution and statewide approach to mature and optimize TSMO capabilities.

In 2023, the American Association of State Highway and Transportation Officials (AASHTO) published the first ever Transportation Operations Manual (TOM) as a resource to guide traffic operations policy, definitions, and overall familiarity with generally accepted best practices. The TOM is a powerful resource as it provides a common basis of TSMO principles for agencies across the country as the single point of reference for all elements of TSMO (strategic, programmatic, and tactical).

In 2024, NCDOT's TSMO unit took a significant step by institutionalizing the TOM as a critical component of NCDOT's TSMO strategic plan. NCDOT aimed to leverage the TOM as a mechanism to formally embed TSMO philosophies into the team's official structures, processes, and culture continuing the drive towards capability maturity, which is a core tenet of TSMO philosophy.

## TSMO PLANNING, STRATEGIES AND DEPLOYMENT

Given the role the TOM would play in NCDOT's TSMO's evolution, TSMO unit leadership carefully considered the deliberate introduction of the manual to the unit. With thoughtful planning and close collaboration, the TSMO team designed an approach that empowered the group to review the TOM and creatively showcase their understanding of its content. Manuals struggle with presenting information in ways that engage the audience, making it difficult for them to effectively use its principles. Therefore, the team focused on ways to present the material that would promote learning through non-traditional means instead of hours long slide-based presentations. The leadership recognized that only a small percentage of the audience would learn from a slide-based style, and they wanted to reach a greater audience. The leadership established the following goals:

- Familiarize the team with the TOM in a fun and interactive way
- Provide a framework to promote use of the TOM in daily operations
- Stretch the unit's knowledge to learn about other TSMO aspects outside of normal work areas
- Encourage the team to provide feedback for manual updates or supplemental materials
- Foster team building and coaching in the unit



**Strategy:** The leadership team's strategy was to break up the unit into teams, with each team composed of individuals with diverse talents, and assigned to present key themes from related TOM chapters to the entire unit. At the core of this strategy was a challenge for each team to creatively deliver content that would provide the audience with information they could apply to their work.

**TOM Implementation Kick off:** The leadership team initiated the exercise with a high energy in-person kick off meeting to inspire enthusiasm and an appreciation for the TOM. This meeting included an engineering-based team building activity and a collaborative review of the first five chapters. It also allowed the teams to form their groups, participate in an ice-breaker activity, assign roles and responsibilities, and brainstorm concepts for their session. At the conclusion, the groups understood their responsibilities for the exercise and were ready to develop their sessions and rehearse.

**Monthly TOM Presentations:** The unit scheduled monthly virtual meetings, during which a selected team presented their chapters in their own unique way to an audience consisting of the TSMO unit plus other Division TSMO personnel. After each session, all attendees received a survey to score each team on creativity, engagement, and information.



### Survey Results – Current Application

- Question 1: Please list any takeaways, best practices, or information from the TOM that you have applied or are currently applying to your work.

• "I learned the importance of having an Active Demand Management Program to help redistribute demand to alternate modes, routes, or times of departure in an overall effort to better manage the transportation networks."  
 • "TSMO best practices and getting participating agencies buy in. Use existing projects as conversation pieces and reasons to involve partnering agencies."  
 • "While we often work in silos, the TOM collaboration allowed us to be exposed to all groups in the TSMO Unit. This will allow us to leverage the expertise of the talented individuals in our unit to help quickly resolve issues or consider ideas from other perspectives."  
 • "I am using section 8.5 as part of our states Systems engineering process. Categorizing projects into levels of complexity to determine the level of systems engineering required."

**TOM Implementation Wrap Up:** TOM implementation concluded with an in-person meeting where teams shared takeaways and memorable moments from other presentations. Prizes were awarded for engaging, informative, and creative presentations, with the top team winning the TSMO cup.

## COMMUNICATIONS PLANNING AND EXECUTION

Content from the TOM was divided amongst twelve groups - each group consisting of team members with varying skill sets, experience, and roles. Teams were assembled strategically to balance perspectives and to foster relationship building. The collaboration was an important component of this implementation's design as this helped to connect teams that otherwise would not have exchanged ideas or perspectives.



Each team embraced the challenge of delivering content virtually to accommodate a statewide audience while remaining entertaining. The TSMO unit's work moved beyond presentations to dynamic learning experiences. These experiences included humor, powerful images, meaningful data, and insights tied directly to the TSMO strategies outlined in the TOM.

The team's commitment and competition became evident early in the yearlong effort. Teams embraced their topics, and turned them into sessions full of energy, wit, irony, nostalgia, satire, innovation, and of course, TOM content.

The sessions varied from news broadcasts filmed from on-scene locations to gameshows with real-time competitions and included references to 80's TV sitcoms with TSMO staff as the actors and innovative uses of AI podcasting tools. Each month, participants laughed with their teammates about their favorite parts of the sessions while gaining knowledge of new topics like the Capability Maturity Model, systems engineering, and even funding and procurement strategies.

## OUTCOME, BENEFITS AND LEARNINGS

The TSMO unit worked to implement the TOM as the preeminent resource to help the team gain familiarity with best practices and policies and empower the team to become subject matter experts while using the TOM in daily operations. A survey was conducted to assess the achievement of these goals, focusing on participants' current application of the TOM, future plans, and any insights that have inspired future learning.

**Applying Lessons Learned from the TOM Today:** Participants are actively applying principles from the TOM to their areas of focus. The TSMO unit has shared that they are applying what they learned to improve everything from transition planning to the use of active demand management programs. Some topics, like systems engineering, have helped ITS designers to better incorporate ITS into the unit's project delivery processes. Other topics, like the Capability Maturity Model, helped the unit understand the principles and vision behind the TSMO Strategic Plan.

**Applying Lessons Learned from the TOM in the Future and Public Benefit:** Participants have shared a variety of areas that they intend to leverage the TOM in the future including equipment procurement and ways to reduce costs on signal projects. Overwhelmingly, the team emphasized finding the TOM useful in identifying ways to better include and manage TSMO

strategies in projects, thus reducing friction in completing projects and reducing time to complete them.



**Catalyst for Continued Learning:** NCDOT's TSMO unit is eager to continue to learn from the TOM after the creative sessions. Topics of interest include work zone traffic control, securing funding, and new technology being developed to support transportation systems. The TSMO unit is continuing the same learning concepts into 2025 and beyond by holding more training sessions on TSMO specific topics presented in creative and innovative ways.