**Projects & Research:**

**Change Orders and Lessons Learned**  This research examined the risks posed by engineering change orders and found that many high risk change orders on roadway construction projects can be avoided through improved front-end planning. Avoidance of other change orders, such as fuel and asphalt price adjustments, however, are more challenging since they can be due to rapidly changing market conditions. The results identified the need for new directions in front-end planning and project scoping to minimize change orders on highway projects.

**Forecasting Construction Staffing Requirements for Future Construction Projects**  Our researchers are gathering relevant information on highway construction staffing. The information to be collected includes the formal and informal methods, models, and practices used to forecast construction staffing requirements for highway construction; identification of factors that can influence construction staffing needs; the use of consultant services in augmenting in-house STA construction personnel; and the use of technology to improve construction staff efficiency.

**Effective Project Scoping Practices to Improve On-Time and On-Budget Delivery of Highway Projects**  Our objectives for this research are to produce a guidebook that demonstrates how a transportation agency can improve its scoping process and practices, and to develop a comprehensive and scalable scoping process template to support the guidebook. This will enable a transportation agency to produce a project cost estimate and schedule that facilitates programming decision making and subsequent project delivery activities.

**Updating the Kentucky Contract Time Determination System (KY-CTDS)**  An outdated KY-CTDS could lead to inaccurate project time estimates, which could negatively impact final contract cost and schedule milestones. Our research aims to update the KY-CTDS by identifying the extent of its use and the accuracy of the tool on completed projects; identifying recommended updates to the original system including software, databases, and project templates; and identifying potential expansions of the original system to better reflect current and future cabinet projects.

**Case Study: The Use of 3D Imaging for Improving Construction Productivity on Infrastructure Systems**  This case study is modeling the effects that 3D imaging could have on improving a project’s construction productivity. Using field data to estimate the durations of discrete construction processes, our researchers are developing discrete event simulation models to benchmark the necessary speed that future 3D imaging systems need to obtain to make their implementation on future construction projects a viable alternative.