



ACCELERATED BRIDGE CONSTRUCTION
UNIVERSITY TRANSPORTATION CENTER

UTC Project Information	
Project Title	Work Zone Safety Analysis, Investigating Benefits from Accelerated Bridge Construction (ABC) on Roadway Safety
University	FIU
Principal Investigator	Mantawy, Islam
PI Contact Information	imantawy@fiu.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC Funds: \$30,000 Match Funds: \$15,000
Total Project Cost	Total Funds: \$45,000
Agency ID or Contract Number	Accelerated Bridge Construction University Transportation Center (ABC-UTC) 69A3551747121
Start and End Dates	2020/01/01- 2021/01/01
Brief Description of Research Project	<p>Due to the growth of highway renovations and construction projects in the state of Florida, the number of work zones has increased. Work zones create traffic congestion and the attributes of work zones have significant impacts on the risk of crash occurrence. According to statistics from the American Road and Transportation Builders Association (ARTBA), Florida is among the top three states for work zone fatal crashes with a total of 73 fatal crashes causing resulting in 80 fatalities in 2016. Work zone crashes constitute approximately 1.6% of the total crashes (i.e., 712,177), with 3,186 injury crashes in 2016 in Florida (S4A). Another important aspect of work zone crashes which needs to be considered by decision-makers, is worker safety. Among the total number of work zone crashes in 2016 in the state of Florida, around 44.8% were associated with worker presence, in which 12 workers were killed. The worker fatalities in 2016 are 9.1% and 57.1% higher compared to 2015 and 2014, respectively (ARTBA). The significant loss of workers' lives and injuries resulting from work zone crashes indicates the emergent need of a comprehensive and in-depth investigation of work zone crash mechanisms. The cost of work zone crashes is another issue that should be taken into account as the work zone crashes impose millions of dollars on society each year. It can be argued that as traffic volume continues to increase, so will work zones. Hence, it is necessary to investigate the possible causes associated to crash severity and frequency to improve work zone safety.</p> <p>According to Manual on Uniform Traffic Control Devices (MUTCD),</p>

	<p>bridge construction/reconstruction is categorized as long-term stationary work zones since the construction duration is basically over three days. This long roadway occupancy and its related components such as lane closures, lane width reductions, changes in road geometry, and the presence of construction workers increase the crash occurrence risk. According to a recent review from Yang et al. (2015) on work zone safety analysis and modeling, over 85% of previous studies regarding work zone crash frequency demonstrate an obvious increase in crash frequencies during work zone operations. Applying innovative construction methods like Accelerated Bridge Construction (ABC) dramatically decreases onsite construction duration, thus improve roadway safety. This safe and cost-effective procedure for building new bridges or replacing or rehabilitating existing bridges in just a few weeks instead of months to years not only saves a lot of crash costs but people's lives. However, so far, there is no such study that assesses the roadway safety enhancement aspect of ABC implementation method. In addition, most of the existing safety research has focused on the traveling public and not on worker safety.</p> <p>This project aims to identify the contributing factors that affect crash frequency and crash severity of work zone crashes through the conjunction of the results from conventional statistical models and machine learning techniques. This can provide a more comprehensive interpretation of work zone crash severity and frequency outcomes. The analysis sheds light on the internal probability patterns of crash contributing factors, as well as their overall impacts. In addition, it seeks to assess the impact of ABC implementation to enhance work zone safety through a benefit-cost analysis, which has not been investigated and documented yet.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here</p>	<p>The outcomes will be tracked and reported once they are identified.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>Strong interest from bridge owners to develop tools using this research output to quantify the safety provided by ABC.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project website 	<p>https://abc-utc.fiu.edu/research-projects/fiu-research-projects/work-zone-safety-analysis-investigating-benefits-from-accelerated-bridge-construction-abc-on-roadway-safety/</p>