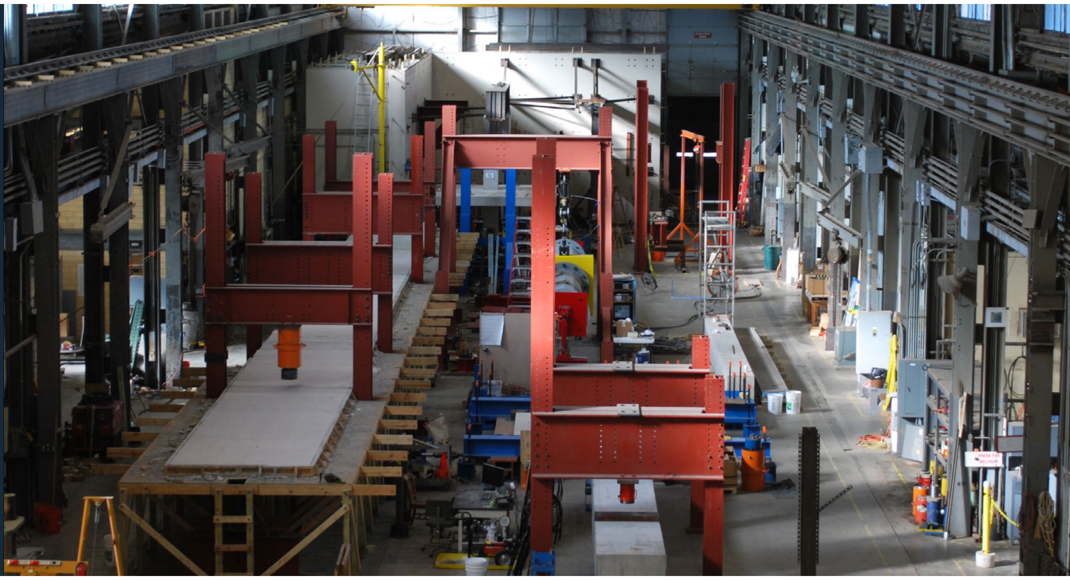
TEXAS
The University of Texas at Austin

FERGUSON STRUCTURAL ENGINEERING LABORATORY



FSEL NEWSLETTER

Volume 12, Issue 1, April 2021

FSEL

The Ferguson Structural Engineering Laboratory (FSEL) located on the Pickle Research Campus of The University of Texas at Austin is named after Professor Phil M. Ferguson, who was an inspirational teacher and a meticulous researcher.

We hope that you enjoy learning about our laboratory and ongoing research.

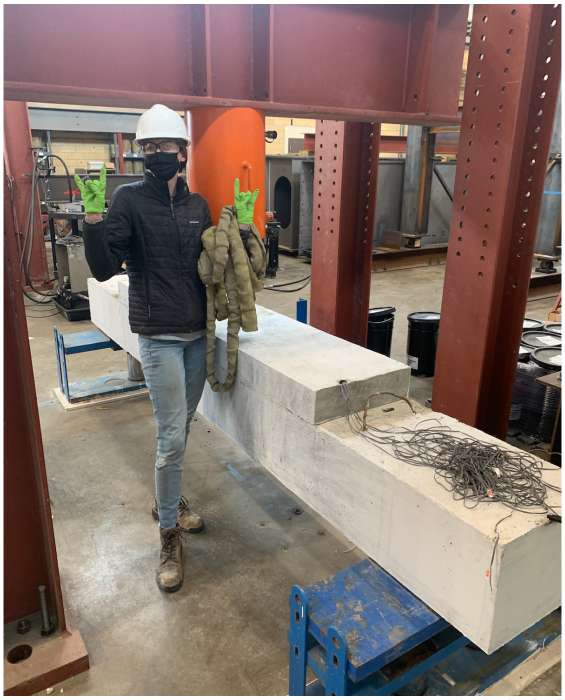
NEWS FROM
BUILDING 24

CONGRATULATIONS!

We would like to congratulate two of our folks who have recently graduated. We wish them the very best in their future endeavors!

- **MAGGIE BECKER** graduated with her M.S. in the Fall of 2020, and started working for Wiss, Janney, Elstner Associates, Inc. in Austin, TX.
- **GHASSAN FAWAZ** graduated with his Ph.D. in the Fall of 2020. He is now working for Datum Engineers in Dallas, TX.

Dr. Ghassan Fawaz



M.S. Maggie Becker

ONGOING RESEARCH AT FSEL

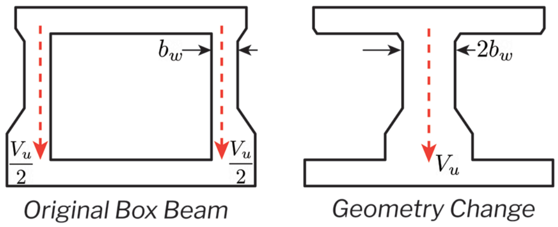
There are currently 45 student researchers working at FSEL, and this newsletter summarizes our ongoing projects. We hope you enjoy learning more about the exciting projects we have going on at FSEL.

ANALYZE SHEAR CAPACITY OF TEXAS STANDARD PRESTRESSED BEAMS FROM STRUT-AND-TIE MODELS OF BEAM ENDS

PROJECT TEAM: JONGKWON CHOI, ZACH WEBB, & HANSOL JANG

SUPERVISOR: OGUZHAN BAYRAK

The goal of this project is to verify that the end region shear stress of Texas standard prestressed beams can exceed the 0.18 f'_c limit using STM. The Texas Standard Prestressed Beams are divided into girders with one web (e.g., I-girders, slab beams) and girders with two webs (e.g., box-beams, X-beams, U-beams). Box-beams are one of the beams which contain two webs, and they have distinctive features compared to the Tx-girders, which influences the end support conditions on load transfer mechanisms. Therefore, an idealized box-beam geometry is needed to calculate shear stresses using STM. Box-beams contain the end blocks in the end region of the beam; for this reason, stress flow is altered. Also, unlike Tx-girders, box-beams have one bearing plate on one support and two bearing plates on the other. Harped strands are not used in box-beams; only debonded strands are used to control the stress at the end of the beam. This geometric difference of the box-beams should be considered to calculate the shear stress of the end region of the beam.



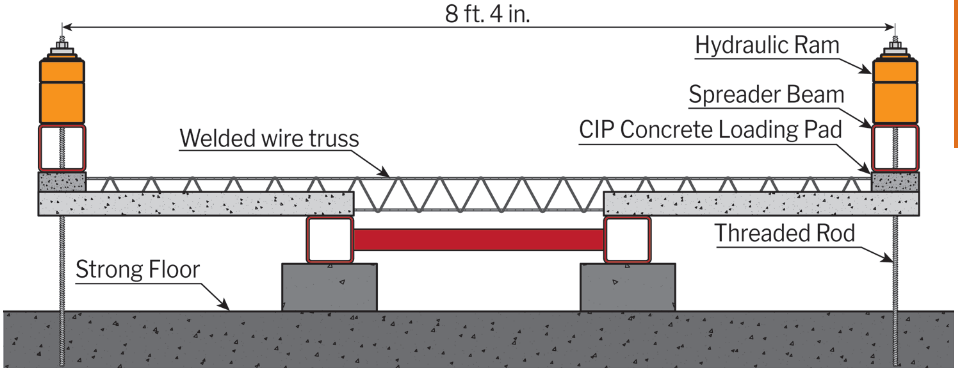
Idealized box beam geometry for analysis

DEVELOP NEXTGEN TEXAS BRIDGE DECK

RESEARCH TEAM: DYLAN GENTRY, ZACH WEBB, DENNIS WANG, JONGKWON CHOI, & FERROVIAL CIVIL ENGINEERS

SUPERVISOR: OGUZHAN BAYRAK

This project aims to develop the NextGen bridge deck, a partial-depth precast concrete panel solution that can be used over the entire width of the deck, including the overhangs. It utilizes welded wire trusses partially embedded in the panels to transfer negative moments generated by the overhangs. After the panels are placed, a cast-in-place concrete topping is applied, enveloping the wire trusses and providing a finished deck. Recently, we have acquired a batch of wire trusses from South Korea and have nearly completed the design for the first phase of load testing. During this semester, we plan to construct the load testing setup, construct testing specimens, and begin load testing the specimens. The first phase of specimens will simulate a bridge overhang during construction: it will be comprised of partial-depth panels with wire trusses, with no cast-in-place concrete on top. They will be subjected to negative moments. We aim to characterize the behavior and performance of the panels during their initial placement before the top layer of cast-in-place concrete is poured.



Front view of Phase 1 Load Testing Setup

DEVELOP AND VALIDATE PRECAST COLUMN SOLUTIONS FOR TEXAS BRIDGES

PROJECT TEAM: LUCAS SILVESTRI, LUKE SMALL, ZACH WEBB, & DENNIS WANG

SUPERVISOR: OGUZHAN BAYRAK

Precast bridge systems can greatly speed up construction, reducing traffic disruptions and the amount of time spent on site. However, there are limitations to using full-height precast columns. The weight and size of larger columns often needed for highway construction requires special equipment for lifting and transportation of the columns to the site, making them expensive to use. The goal of TxDOT Project 0-7089 is to investigate alternative column systems that can accelerate construction and be more economical. One system being investigated is a precast concrete shell filled with cast-in-place concrete.

The project team has recently completed a literature review, extending the findings from a synthesis project (TxDOT Project 0-6978). The literature review focused on more recent experiences with precast columns, international experiences, and previous research on vertical unreinforced interfaces. The research on the interfaces is important in characterizing the interaction between the precast shell and the cast-in-place concrete of the proposed system. This will assist in designs that facilitate composite action between both elements of the column, a necessity for vsuch a composite system. The project team is currently preparing to test unreinforced vertical interfaces with a variety of different surface conditions and concrete mixtures, as well as undergoing preliminary column designs for larger-scale testing.

Precast shell system being installed in Waco, TX, like the system being investigated.

IN THIS ISSUE

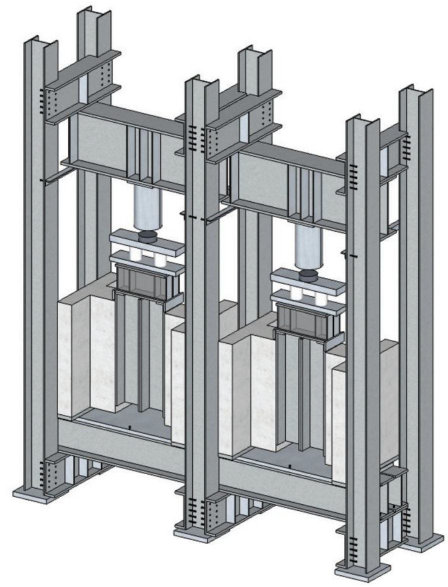
DEVELOP GUIDANCE FOR STRUCTURAL BEHAVIOR OF TALL HAUNCHES IN TXDOT BEAM AND GIRDER BRIDGES

PROJECT TEAM: NIDHI KHARE & ZHENGHAO ZHANG

SUPERVISORS: ERIC WILLIAMSON, TODD HELWIG, & OGUZHAN BAYRAK

The haunch is the region between the top of a bridge girder and the bottom of the concrete deck and is used to help maintain a uniform deck thickness. Tall haunches (≥ 6 inches) are often encountered in steel or prestressed bridge girders, particularly in situations with complex geometries or due to issues with construction tolerances. Current TxDOT detailing practices for tall haunches have not been thoroughly tested. The goal of this research is to verify the effectiveness of currently used tall haunch details and establish improved design methods based on the results of large-scale push-out tests.

Modified push-out tests that can accommodate tall haunches will be performed in the coming months for ultimate shear capacity testing of haunches in steel and prestressed girders. The test program will include variable haunch heights (up to 15 inches) and detailing strategies. The research will also include analysis of the test data and finite element modeling to create guidelines for a range of applicable haunch designs. A parametric study will represent the range of dimensions encountered for the vast majority of Texas bridges.



Push-out Test Setup for Steel Girders

EVALUATION OF SEAMLESS BRIDGES

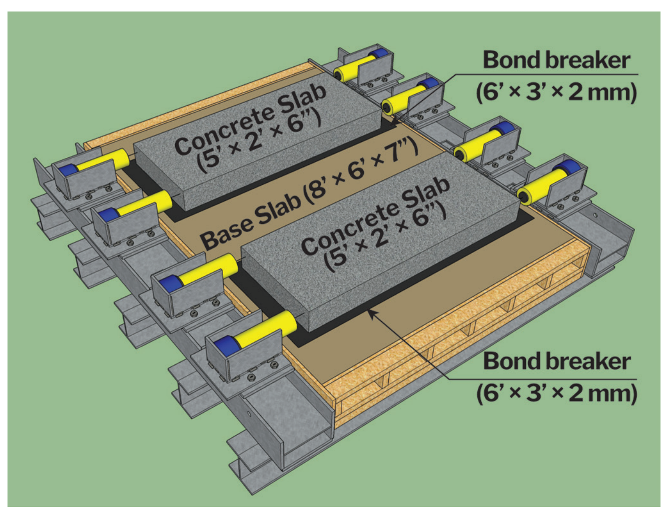
RESEARCH TEAM: XIAOYI CHEN, JAY HEMENDRA MALVIYA, & GEORGE GE

SUPERVISORS: TODD HELWIG, JORGE ZORNBERG, & JUAN MURCIA-DELSO

In a seamless continuously reinforced concrete pavement (CRCP)-bridge system, the pavement and the bridge deck are connected through a jointless transition zone. The primary goal of this project is to evaluate the seamless system behavior and propose design guidelines for the transition zone and the bridge members, if necessary. The project includes two-phase experimental testing, analytical modeling, and field monitoring.

In Phase I, the interface shear strength at the interfaces of concrete-hot mixed asphalt (HMA) with two layers of polyethylene sheets and concrete-cement stabilized base (CSB) with one or two layers of polyethylene sheets have been tested by using the unit-cell direct shear test setup in the Geotechnical Engineering Laboratory. The research team will continue to test the interface of concrete-HMA, concrete-CSB, and concrete-CSB with woven or nonwoven geotextile. Meanwhile, the research team started the fabrication of Phase II full-scale test setup, which includes a self-reacting system for the evaluation of interface characteristics between the concrete slab and CSB with different types of bond breakers under cyclic horizontal loading.

The research team also developed SAP 2000 models of a seamless bridge-approach slab-transition slab system and conducted a parametric analysis to evaluate the effects of slab reinforcement ratio, slab thickness, and slab-base coefficient of friction.



Scheme of Phase II Test Setup

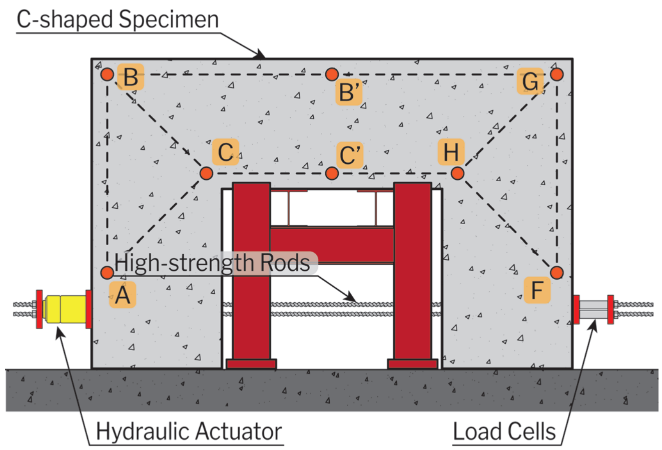
DEVELOPMENT OF KNOWLEDGE IN THE APPLICATION OF STRUT-AND-TIE MODELING

PROJECT TEAM: ANAS DAOU, HWA-CHING WANG, YIBIN SHAO, AYAH ALOMARI, & ZACH WEBB

SUPERVISOR: OGUZHAN BAYRAK

Currently, the Research Team is studying the mechanics of load transfer by using high-fidelity instrumentation. Accompanying FEM models for the test specimens will inform the study of the mechanics of load transfer. Ultimately, with a better understanding of the load transfer mechanism, and aided by full-scale tests and realistic analyses, the Research Team will develop design recommendations consistent with the existing STM provisions of AASHTO LRFD Bridge Design Specifications. The current task of the project will examine the mechanics of load transfer at a curved bar node in a C-Shape specimen.

Next, the beneficial effects of confinement will be studied and analyzed in a manner consistent with the development of AASHTO LRFD Bridge Design Specifications' STM provisions.



C-Shaped specimen setup sketch

EVALUATE THE DEPLOYMENT OF HIGH STRENGTH REINFORCING STEEL IN TEXAS

PROJECT TEAM: YONGJAE YU, ZACH WEBB, ANDREA SCHMIDT, & CHESKA ESPANOL

SUPERVISORS: OGUZHAN BAYRAK & JUAN MURCIA-DELSO

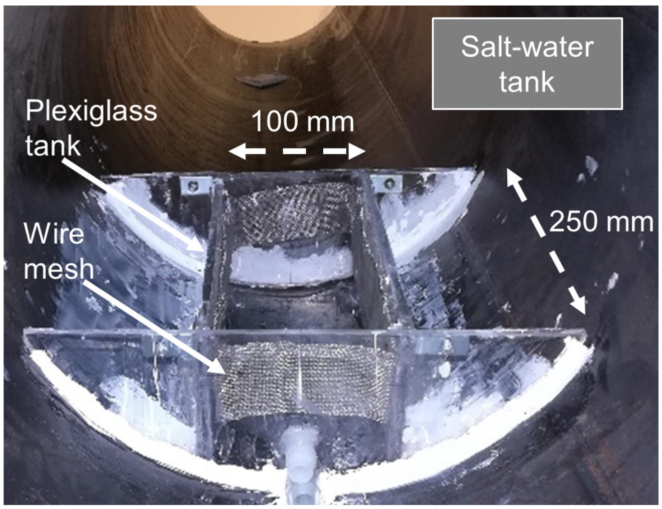
The past decade has seen increased interest in the use of high-strength steel in reinforced concrete construction as commercially available high-strength steels have been incorporated into material specifications and permitted in specific articles of concrete building and bridge design codes. High-strength steel offers several benefits such as reduced reinforcement quantities, cost savings, and reduced congestion. To date, TxDOT bridge designers have not implemented high-strength reinforcing steel in practice for a number of reasons, including gaining comfort with new technologies, the potential need for enhanced requirements beyond the specifications for Texas bridge components and systems, and durability concerns. This project aims to remove barriers that limit the implementation of high-strength reinforcing steel in Texas bridge designs. Currently, a comprehensive literature review and a survey to collect bridge examples were conducted. Subsequently, the researchers will address where and when it makes sense to use high-strength reinforcing, what benefits can be realized, who else uses high-strength reinforcing, and how they are using it. Later, a series of analytical and experimental test programs covering a wide range of structural bridge components will be conducted.

INTERNAL CORROSION MONITORING IN PIPELINES BY USING HELICAL ULTRASONIC WAVES

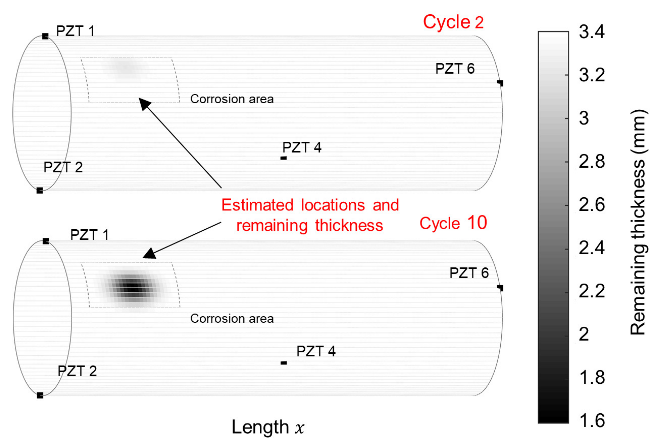
RESEARCHER: STYLIANOS LIVADIOTIS

SUPERVISOR: SALVATORE SALAMONE

The main objective of this project is to design, implement, and validate a combination of structural health monitoring (SHM), and nondestructive evaluation (NDE) technologies for detecting, evaluating, and monitoring the progression of corrosion in pipelines. This new approach is based on utilizing a novel class of waves called helical guided ultrasonic waves (HGUW) that offer several advantages over traditional guided waves, such as the small number of sensors required. To this point, a two-step localization-quantification algorithm for corrosion detection in large diameter steel pipes has been developed. The algorithm combines the algebraic reconstruction technique for the first part and a parametric 2D acoustic modeling for the latter. An accelerated corrosion test was performed in the inner surface of a 12" OD, 3.4 mm thick pipe while recording HGUW for a total of 10 cycles (50% thickness loss). The proposed algorithm was capable to accurately localize and characterize the growing corrosion patch even at the early stages.



Water-tank inside the pipe to hold the salt-water solution



Estimated locations and remnant thickness for cycles 2 & 10 of the test

PROPOSED MODIFICATIONS TO AASHTO CROSS-FRAME ANALYSIS AND DESIGN

RESEARCH TEAM: MATT REICHENBACH & SUNGHYUN PARK

SUPERVISORS: TODD HELWIG & MICHAEL ENGELHARDT

NCHRP Project 12-113 aims to improve the design and analysis of cross-frame systems in steel I-girder bridges. Cross-frames have traditionally been detailed and fabricated based on general rules-of-thumb. In recent years, however, developments in highway bridge design and analysis have necessitated the modernization of cross-frame design and analysis practices. More specifically, the appropriate design criteria for fatigue and stability bracing are investigated. With the final report submitted in September 2020, the team has since prepared ballots that were presented to the AASHTO Highway Subcommittee on Bridges and Structures in January 2021. After several rounds of comments and editing, the team anticipates that these proposed modifications will be implemented into the next edition of the AASHTO LRFD Bridge Design Specifications. Additionally, the team is planning to experimentally test eccentrically connected WT sections over the summer, as an extension to the original NCHRP study.

Eccentrically connected single-angle specimen examined as part of the original NCHRP study.

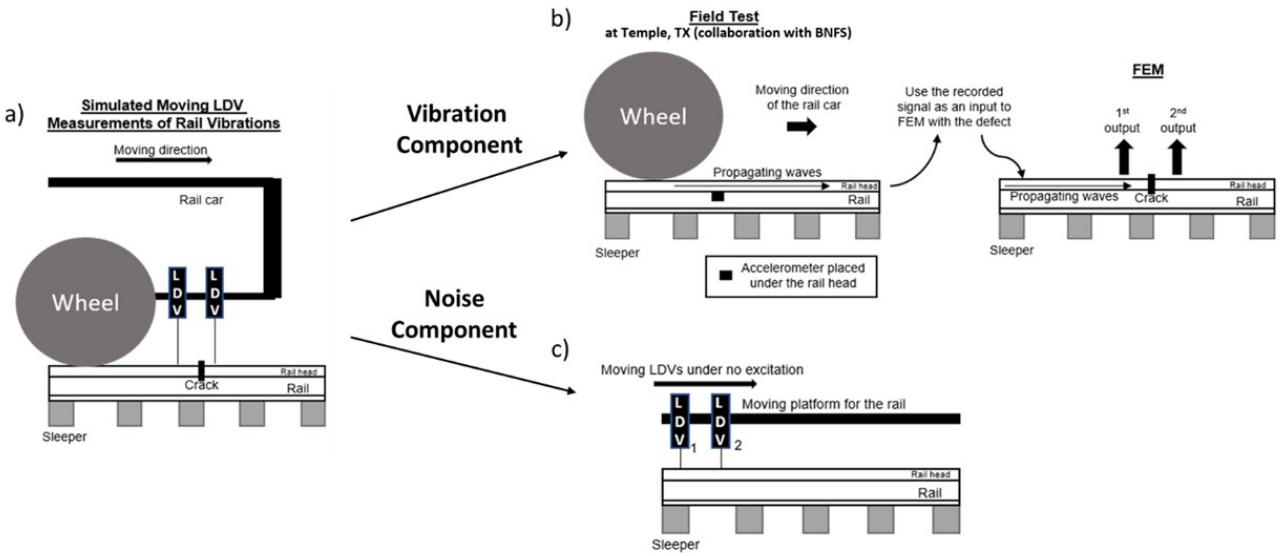
RAIL DEFECT DETECTION BY NON-CONTACT VIBRATION MEASUREMENTS

RESEARCH TEAM: KORKUT KAYNARDAG & CHI YANG

SUPERVISOR: SALVATORE SALAMONE

The goal of this research is to develop a novel non-contact system to detect internal defects in railheads. The detection is performed by applying damage detection techniques to the vibration and wave propagation signals collected from rail using laser Doppler vibrometers (LDVs) placed on moving rail cars.

Recently, vibration signals collected from rail using accelerometers during the passage of a rail car was given as input to Finite Element Method (FEM) models of rails which consisted of different size of cracks in the railhead. The data was extracted from the model at points located before and after the location of defects. As a result, measurements of rail vibration using LDVs were simulated. However, the simulated measurements do not consist of the noise component that would exist in moving LDV measurements. Therefore, in the following steps, to obtain the noise component, LDVs will be moved over the rail in the laboratory without inducing the rail. Afterward, the simulated vibration responses will be combined with the noise component of measurements to simulate the signals collected from rails using LVDs placed on rail cars. Then, noise elimination techniques will be applied to obtain the rail vibration component to facilitate the damage detection.



REFINED DESIGN METHODS FOR LEAN-ON BRACING

RESEARCH TEAM: DAVID FISH, AIDAN BJELLAND, CHEN LIANG, MATT REICHENBACH, & CLAIRE GASSER (TEXAS A&M)

SUPERVISORS: TODD HELWIG, ERIC WILLIAMSON, MICHAEL ENGELHARDT, MATTHEW YARNOLD (TEXAS A&M), & STEFAN HURLEBAUS (TEXAS A&M)

Cross-frames and diaphragms are important elements to ensure adequate resistance to control lateral torsional buckling during construction. However, these braces often represent the costliest component per unit weight due to the extensive handling, cutting, and welding requirements during fabrication. In addition, fatigue concerns exist in and around the braces throughout the service life of the bridge. Lean-on bracing is an alternative method to stabilize the girders that selectively positions cross frames in each bracing line to facilitate installation and minimizing forces induced from in-service traffic. Top and bottom struts are provided to lean several girders on a single cross frame. Due to limited existing design guidance, the objective of the research project is to develop and refine design guidelines for lean-on bracing applications.

This project includes field monitoring and parametric finite element modelling. The research team has been working to identify existing bridges as well as bridges in the design stage for potential monitoring. Data obtained from field measurements will be utilized to validate finite element models that will be used to study a wide array of bridge geometries. The goal of the study is to develop refined guidelines on the design of lean-on bracing systems in steel bridge systems.

SHEAR BEHAVIOR OF SPLICED POST-TENSIONED GIRDERS WITH UNGROUTED TENDONS

RESEARCH TEAM: SANGYOUNG HAN, JONGKWON CHOI, & ZACH WEBB

SUPERVISOR: OGUZHAN BAYRAK

The project aims to evaluate the spliced girder -post-tensioning system in the prestressed precast member- in terms of shear resistance between grouted and ungrouted ducts. This structural testing includes six testing specimens with various post-tensioning designs, such as three different duct layouts, to compare the shear performance of girders with an empty duct to girders where the duct is grouted. At present, the structural testing program with three grouted specimens has been completed. The post-tensioning design within grouted group yields different levels of shear strength. Considering the enormous size of a testing specimen with a length of 50 ft. and a height of 70 in., the progress of the testing program has been successful, and no issues have been encountered. This achievement is possible due to the contribution of staff members and students. The structural testing program is now focused on the remaining ungrouted specimens, which is expected to finish by the Summer.

Structural testing

STRUT-AND-TIE MODELING AND DESIGN OF DRILLED SHAFT FOOTINGS

RESEARCH TEAM: YOUSUN YI & DENNIS KIM

SUPERVISORS: TREVOR HRYNYK, JUAN MURCIA-DELSO, & OGUZHAN BAYRAK

The design and detailing of reinforced concrete footings supported by a grid of drilled shafts varies significantly on a state, district, and even municipality basis due to the continued use of legacy sectional design method. Therefore, a full transition to strut-and-tie modeling is required for uniform design and detailing of shaft-supported footings. This project hopes to refine the STM guidelines for 2D structures for 3D structures, such as shaft-supported footings, through experimental and analytical approaches.

At present, the 3D-STM team is conducting tests for drilled shaft footings subjected to a load combination of severe uniaxial flexure and axial compression. Due to a large amount of flexure, two of four drilled shafts are subjected to tensile reaction, and the drilled shaft reinforcement that extends into the footing resists the tie force induced by the tensile reaction. The research team simplified the loading condition and designed a test set-up for large-scale structural testing.

In the context of the strut-and-tie modeling, all reinforcing bars placed at the region where a tie element is located need to be fully developed. Therefore, the research team will propose a critical section of the drilled shaft reinforcement embedded in the footing for its anchorage requirement based on the test results.

Test Setup

SYSTEM LEVEL SEISMIC PERFORMANCE OF STEEL GRAVITY FRAMING

RESEARCH TEAM: SANGWOOK PARK & ADAM SCHULZ

SUPERVISORS: PATRICIA CLAYTON, MICHAEL ENGELHARDT, TODD HELWIG, & ERIC WILLIAMSON

This project investigates the role of gravity framing systems on the seismic performance and collapse resistance of steel buildings. The project mainly focuses on the contribution of the metal decking and the restraint provided by surrounding framing bays on the connection behavior at large inter-story drifts. Experimental tests and computational analysis will be conducted to discover the contribution of the system during project years.

Experimental testing program includes two composite steel gravity framing system specimens to simulate realistic boundary conditions and restraint to a frame expansion provided by neighboring bays. As the current work progress, the NSF research team (Sangwook and Adam) pulls out all the stops to assemble structural elements for the first specimen. The second bay out of three is under construction on the strong floor. The preliminary test is tentatively scheduled in March or April for the time being.

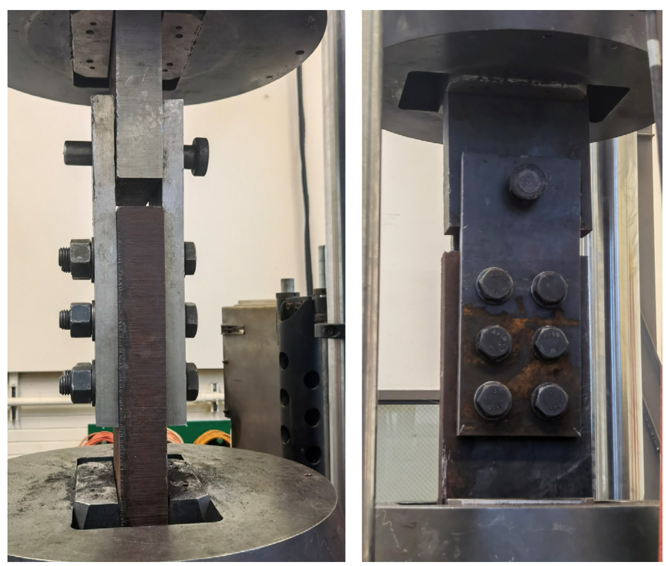
Test Setup during erection

USE OF LARGER DIAMETER SHEAR STUDS FOR COMPOSITE STEEL BRIDGES

PROJECT TEAM: LU WAN, XIANJUE DENG, & YUCEL ALP

SUPERVISORS: MICHAEL ENGELHARDT, TODD HELWIG, & ERIC WILLIAMSON

The main objective of this project is to investigate the feasibility of using larger diameter shear studs up to 1-1/4" in bridge design. The research team has finished the material tests: tension test, shear test and Charpy V Notch Tests for 7/8", 1", 1-1/8", and 1-1/4" shear studs. Data from these tests will be used in the further tasks. The research team is also performing stud welding investigations to evaluate the welding quality of four diameter shear studs on 1" and 2" thick plates. The tests involved in this task are weld tension test, bend test and macro etch weld test. The welding investigations for 7/8" and 1" shear stud have been finished and no problem reported. After finishing the welding investigations, the research team will determine the most feasible larger diameter stud (1-1/8" or 1-1/4") for practical application. Next, push-out tests, a large-scale beam test and FEM parametric studies will be performed to investigate the static and fatigue behavior of the chosen larger diameter shear studs.



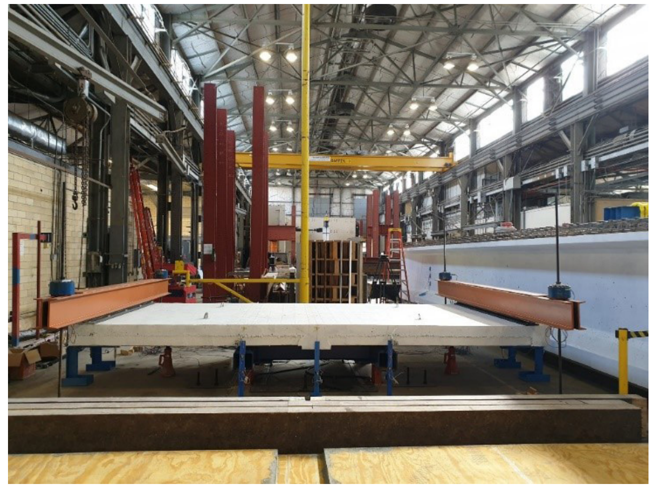
Shear Test Setup

UTILIZING STEEL FIBERS AS CONCRETE REINFORCEMENT IN BRIDGE DECKS

RESEARCH TEAM: JONGKWON CHOI, SOON KWANG JEONG, JARROD ZABORAC, COLIN CHAPPELL, ZACH WEBB, & THANOS DRIMALAS

SUPERVISORS: OGUZHAN BAYRAK, JUAN MURCIA-DELSO, & KEVIN FOLLIARD

Precast, prestressed concrete panels (PCPs) as a stay-in-place formwork is the method widely used in Texas. PCPs support the weight of the cast-in-place (CIP) top half of the concrete and the loads from traffics. Bridge decks often experience cracking during the service. Bridge decks are susceptible to deteriorations from cracks and are commonly repaired elements. Steel fiber reinforced concrete (SFRC) can improve concrete cracking behavior. This project develops improved SFRC mix design and optimized reinforcement details. Deck strip tests evaluate crack control and load-resisting performance under idealized flexural loading condition. Nonlinear finite element analysis in conjunction with deck strip tests will give agreeable design specification for full-scale testing. Full-scale test with four different optimized reinforcements will be tested to examine the system level performance of SFRC bridge decks. During 2021 spring, the team will continue to perform task 5 which is evaluating cracking behavior of top mat concrete for longitudinal and transverse direction.



Test Setup and Specimen

DEVELOPMENT OF NON-FRACTURE CRITICAL STEEL BOX STRADDLE CAPS

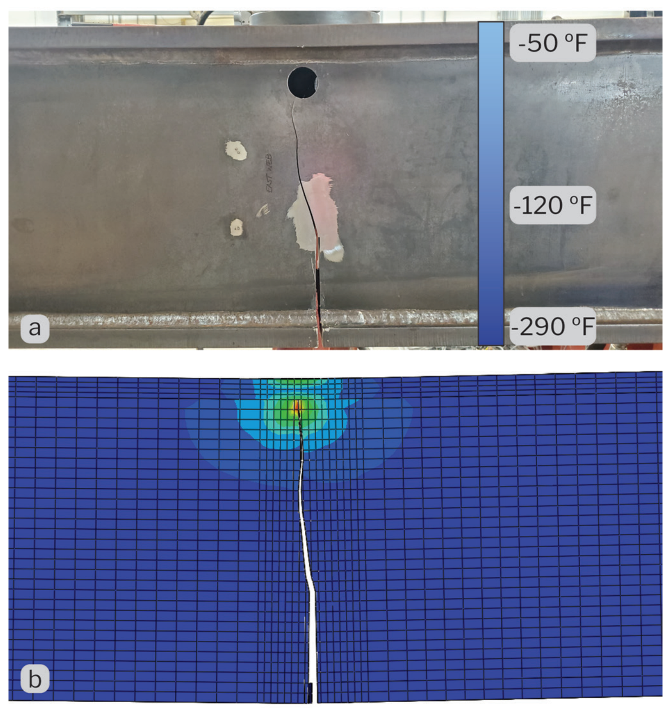
RESEARCH TEAM: ESTEBAN ZECCHIN, CHEN LIANG, MATT REICHENBACH, & EMMA WILLIAMS

SUPERVISORS: TODD HELWIG, MICHAEL ENGELHARDT, & ERIC WILLIAMSON

Fracture Critical classification (AASHTO LRFD, 8th Ed.) imposes more stringent design, fabrication, and inspection requirements to steel box straddle caps (SBSCs), resulting in increased long-term costs. This research project aims to design internally redundant SBSCs that would therefore be classified as Non-Fracture Critical.

The experimental testing phase is currently underway. The proposed testing protocol includes initiating a crack by cutting notches at both edges of the bottom flange and the tension part of the webs and cyclicly loading the specimen to produce a sharp crack tip. Then, the specimen is cooled down with liquid nitrogen to reach lower-shelf fracture toughness and is finally loaded until fracture occurs. The research team has successfully conducted three fracture tests on two pilot specimens of reduced dimensions. These results allowed to tune the hydraulic controllers and DAQ systems to the researchers' needs. Furthermore, FE analyses that include the crack propagation through the Extended FEM (X-FEM) have been validated using these results.

At present, the researchers are assembling the test setup for the upcoming full-scale testing, which is expected to start in late Spring.



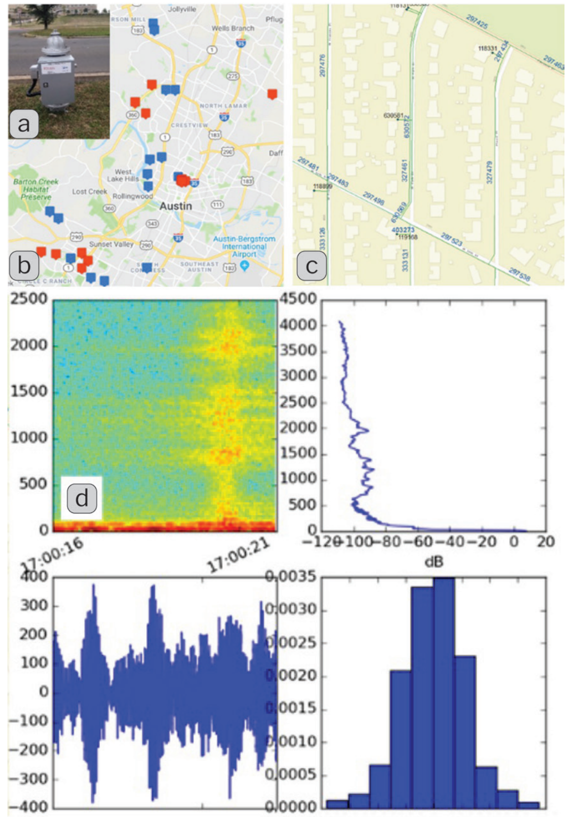
(a) Pilot Specimen after fracture test -temperature profile at fracture indicated-, (b) validated Abaqus XFEM model

SMART LEAK-DETECTION IN WATER NETWORKS THROUGH LOW-COST NONINTRUSIVE DISTRIBUTED ACOUSTIC SENSORS

RESEARCHER: KONSTANTINOS SITAROPOULOS

SUPERVISORS: SALVATORE SALAMONE & LINA SELA

Leak detection and assessment of pipes in water distribution systems spanning huge geographical distances is complex, since the majority of the pipes are buried underground and are not readily available for visual or physical inspection. Conventionally, leak detection relies on periodic inspections, which are time-consuming and depend heavily on the skills of the inspectors. The overreaching goal of this research is to develop new computational techniques for leak detection in water systems through transforming raw sensing data into actionable information for detecting leaks-before-breaks and, in turn, reducing the associated costs, service disruptions, as well as water and energy losses. The research team will utilize a fixed sensor network of permanently installed low-cost, non-intrusive sensors and advanced data mining techniques that continuously processes the raw data. The main objective is to characterize and benchmark the acoustic signature of leaks in water distribution systems (e.g. identify dominant frequencies and spectral densities), and test the sensitivity of acoustic signatures to leak size and location, hydraulic conditions (e.g., background pressure and flow), as well as pipe parameters (e.g., size and material). On top of that, advanced data processing algorithms will be employed to automatically identify and locate leaks by analyzing the acoustic waves recorded by hydrophones.



(a) Sensor mounted to a fire hydrant, (b) network of distributed sensors, (c) typical pipe layout in a neighborhood, and (d) rudimentary analysis of the acoustic signal

NEW FACES AT FSEL

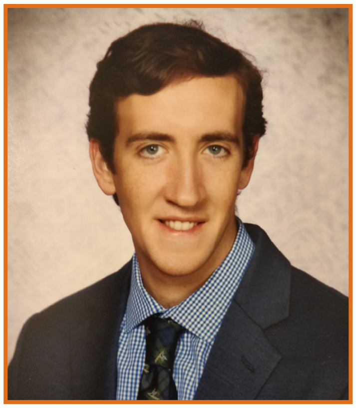
AIDAN BJELLAND

As a kid, I always enjoyed building things, and in the long term, that passion led me to pursue civil engineering. So, I attended Arizona State University and obtained a B.S.E. in civil engineering and an M.S. in structural engineering. Through achieving those degrees, my mind toiled with the idea of whether I wanted to pursue a life out in the field or in academia. However, after being a teaching assistant, I learned of my love of teaching and decided professorship was my long-term dream. Here in Austin, I plan to realize that dream with a Ph.D. in structural engineering.

AYAH ALOMARI

I am one of those annoying Californians who moved to Austin, but I have lived here most of my life and consider myself an Austinite. I received my B.S. in Civil Engineering at UT Austin with a certificate in Humanitarian Engineering. I am currently pursuing my Master's in Structural Engineering working under Dr. Bayrak on Strut and Tie Modeling. In my spare time, I enjoy hanging out with my chickens, taking my kayak around Red Bud Isle, and reading comics.

LUKE SMALL



I am a first-year Master's student from Haddonfield, NJ, where I have lived since starting school. I graduated with a BS in Civil and Environmental Engineering with an emphasis in structures from Cornell University in May of 2020. I am very excited to be attending the University of Texas at Austin and researching precast column solutions for Texas bridges with Dr. Bayrak. In my free time, I enjoy road and mountain biking, running, and being outdoors.

NIYAM SHAH

I am currently a second-semester Master's student working with the Concrete Bridge Engineering Institute and Dr. Oguzhan Bayrak to research the behavior of closure joints in accelerated bridge construction and the use of Ultra-High Performance Concrete. I am originally from Central New Jersey and received my BS in Civil Engineering from the New Jersey Institute of Technology. Outside of work and school, you can find me playing basketball, exploring nature, or eating food at the numerous restaurants around town.

You can see a full list of our current students, staff, and faculty on our website

CONTACT US

Esteban Zecchin
Newsletter Editor
ezecchin@utexas.edu

Ferguson Structural Engineering Laboratory
(512) 471-3062
fsel-main@austin.utexas.edu