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| **UTC Project Information – Project 2.11** | |
| Project Title | Culvert Rehabilitation using 3D Printed Diffusers |
| University | University of Maine |
| Principal Investigator | Roberto Lopez-Anido |
| PI Contact Information | Department of Civil Engineering  Advanced Structures and Composites Center  University of Maine  5711 Boardman Hall, Orono, ME 04469-5711  [rla@maine.edu](mailto:rla@maine.edu) |
| Co-PI(s) | James Anderson and Douglas Gardner |
| Co-PI Contact Information | Advanced Structures and Composites Center  University of Maine  35 Flagstaff Road Orono, Maine 04469  [James.m.anderson@maine.edu](mailto:James.m.anderson@maine.edu) [douglasg@maine.edu](mailto:douglasg@maine.edu) |
| Funding Source(s) and Amounts Provided (by each agency or organization) | UMaine: $100,445  MaineDOT: $6,500 |
| Total Project Cost | $158,467 |
| Agency ID or Contract Number | 69A3551847101 |
| Start and End Dates | 1-JUL-20 to 30-JUN-22 |
| Brief Description of Research Project | Due to the increasing number of deteriorating and failing culverts under highways in Maine and across the nation, efforts have been underway to reduce costs by slip lining selected culverts rather than replacing them. While slip lining extends the useful life of culverts, it reduces the diameter of both the culvert and the inlet thus reducing culvert capacity. Utilizing diffuser technology can more than compensate from the reduction in capacity that results from the slip  lining process. This trenchless technology of slip lining a culvert and adding a performance enhancing diffuser outlet can extend the useful life of the culvert by decades without compromising capacity. A partnership between MaineDOT and UMaine has provided a unique opportunity to utilize large-scale 3D printing technology to design and manufacture diffusers with the specific geometry required for each field installation. Whereas the use of fiberglass or reinforced concrete  would require different forms for each different size diffuser, 3D printing can simply add a scaling factor to an existing diffuser design. Large-scale 3D printing technology using low-cost materials shows great promise in designing and manufacturing inexpensive and site-specific diffusers. Because the addition of a diffuser would eliminate the reduced capacity resulting from slip lining, this cost-effective trenchless technology could be used much more broadly. |
| Describe Implementation of Research Outcomes (or why not implemented)  Place Any Photos Here |  |
| Impacts/Benefits of Implementation (actual, not anticipated) |  |
| Web Links   * Reports * Project website |  |