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**2021 Initial Idea Development**

*2021-2022 NRRA Research and MnROAD Construction Development*

*(Updated Form – March 23, 2021)*

*Initial Proposal is for NRRA Executive Team to Approve for further development (keep to two pages)*

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| **Research Title:** | Fiber Mixing Technology and Guidelines |
| **NRRA Team(s):** | Rigid |
| **Type of Effort:** | Synthesis |
| **Developed By:** | Rob Golish-MnDOT, Manik Barman-UMD, Jerry Welch-Forta, Tom Burnham-MnDOT |
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| **Phone:** |  |

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| **Research Funding Estimate:** | $50,000 |
| **Research Years Expected:** | 9 to 12 months |
| **Beneficial Partnerships:** | N/A |

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| **Number of Test Sections:** | N/A |
| **Instrumentation Effort:** | N/A |
| **MnROAD Monitoring:** | N/A |

**Research Objectives:**

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| As more agencies construct thin concrete pavement and overlays, there has been an increase in the number of projects utilizing fiber-reinforced concrete to enhance performance. Key to the performance is uniform distribution of the fibers in the mix. Various methods for mixing and guidelines for placement have been used in these projects. Through a survey and review of case studies in NRRA member states, this synthesis hopes to capture the state of the practice related to the use of structural fibers in concrete pavements. Topics to be considered include:   * How fibers are introduced into the mix * Ramifications of adding fibers to mix (i.e. need to alter mix design)   + Effects on mixing time   + Effects of transporting the mix   + Effects of vibration * How to prepare and test specimens * How to evaluate uniform distribution of fibers * Typical specifications * Construction issues and resolutions * Lessons learned |

**Pavement Test Cells Needed:**

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| None. While this is a synthesis, there is a strong possibility that future test sections at MnROAD will utilize the fiber mixing guidelines develop here. |

**NRRA Sustainability/Resiliency and or Intelligent Construction:**

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| Incorporating fibers into thin concrete pavements are often the key to their long-term performance, especially when subject to heavy traffic loads. Any and all aspects of technologies that improve performance and extend pavement life lead to increased sustainability. |

**Cross-cutting Opportunities:**

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| Future research and test sections utilizing fiber-reinforced concrete would benefit from the information gathered in this synthesis. The incorporation of fibers into various asphalt technologies in also gaining popularity, thus the NRRA Flexible and PM teams may have interest in this topic. |

**Implementation Plan:**

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| Findings from this synthesis could be used by agencies to validate or improve fiber mixing guidelines and practices. Implementation would be dissemination of the information in the form of a tech brief and final report posted on the NRRA Team webpage(s), as well as presentations at NRRA and other pavement related conferences. |