

2019 UDOT RESEARCH PROBLEM STATEMENT

*** Problem statement deadline is Feb. 6, 2019. Submit statements to UTRAC@utah.gov. ***

Title: Analytical framework for life cycle and performance assessment of the equipment programs **No. (Office Use):** 19.02.03

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Select **ONE** Subject Area Materials/Pavements Maintenance Traffic Mgmt/Safety Structures/Geotech
 Planning Perf Mgmt/Data Analytics Public Transportation Other

1. Describe the problem to be addressed:

In 2017-2018, a UTRAC project was conducted to perform life-cycle assessment of class 8 snowplow trucks using big-data analytics. The project leveraged comprehensive datasets regarding class 8 maintenance cost, mileage, fuel usage for the past 17 years as well as the Verizon AVL data to determine the optimal life cycle for class 8 as well as the performance discrepancy across regions. The result of the project was helpful in offering guidance on class 8 replacement prioritization as well as budget allocation.

The UDOT maintenance is interested in expanding the analysis and rather developing a mature analytical framework for various types of equipment programs to conduct life cycle assessment and prioritize funding allocation.

2. Write the project objective (25 words or less):

The objective of this project is to build an analytical framework for life cycle assessment and characterize the performance of various equipment programs, such as sweeper, loader, and other tractor assets. The project will specifically identify the type of data needed to analyze the performance of each asset and provide recommendations for budget allocation across different types of assets.

3. Explain why this research is important:

(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

Performance-based data-driven approach for equipment program monitoring has always been the emphasis for the UDOT. The streamlined framework will enable UDOT to modify the program as needed and ensure the ability to respond to stakeholders (senior leadership, legislature, public) about the value and impact the funding is having in achieving the objectives and providing value to the transportation system and travel public.

4. List the major tasks:

1. Identify the equipment programs for performance and life cycle assessment
2. Identify and collect data for each program. Data such as mileage, operating hours, maintenance cost, etc. will be the initial main focus, more micro and detailed data will be collected for each specific program, if available
3. Conduct life cycle assessment and performance analysis for each equipment program (or asset type)
4. Build transferable analytical framework for different equipment programs

5. List the expected deliverables (reports, manual, specification, design method, training, etc.):

1. A detailed guideline on life cycle assessment and performance analysis of identified equipment programs

6. Describe how the research results will be implemented:

(In response, consider addressing UDOT leader support, process or standard improvement, etc.)

The research results will help guide funding allocations and adjustments across different equipment programs.

7. Requested from UDOT: \$40,000
Cost: \$80,000

Other/Matching Funds: \$40,000

Total

(or UTA for Public Transportation)

8. Outline the proposed schedule, including start and major event dates:

The schedule assumes a August 2019 start date and a 12- month research plan, with final report delivery in September 2020.

Task 1: Identify equipment programs for analytical framework building – one month (September 2019).

Task 2: Stakeholder Outreach – 3 meetings over 12 months:

i) Project kickoff and finalize on the scope (August 2019);

ii) Presentation of preliminary findings (January 2020);

ii) Presentation of final research products (August 2020);

Task 3: Data collection and preliminary analysis – 3 months (September-November 2019)

Task 4: Life cycle assessment and performance analysis – 5 month (December 2019 – April 2020)

Task 5: Framework guideline development -- 3 months (May 2019-July 2020)

Task 6: Final Report – 2 month (September 2020)