

**Number:** 25-52

**Proposed Title: Addressing the Skilled Paving Worker Shortage Issue and the Associated Problems**

1. Concisely describe the **transportation issue** (including problems, improvements, or untested solutions) that Oregon needs to research.

According to the Associated General Contractors of America (AGC), 2.3million construction jobs disappeared after the 2008 recession, and only a 1.2million were returned back after the recovery period. During the Covid-19 pandemic, about one-third of construction firms furloughed or terminated employees due to shutdowns and canceled/delayed projects. The AGC (AGC, 2020) also reported that 73% of highway and transportation contractors have several unfilled craft positions available. According to the AGC survey, 92% of the firms have a hard time filling most of the positions, although 89% significantly increased their base pay rates. These responses highlight a serious problem today affecting the construction and paving industry.

Careers in the paving industry are generally not perceived as desired choices, especially by generations Y and Z. One of the major reasons for this negative impression is the misconception portraying pavement construction as extremely labor intensive with an insignificant technology component. With today's advanced technologies used for road construction, the level of hard labor required for pavement construction is minimal. Another common prejudice in the eyes of the public is that pavements are just constructed by following a simple process without having any engineering and technology components, although the design, material production, construction, and maintenance of pavement structures are not different from other major civil engineering structures. Although there are several university programs teaching the importance of construction engineering to college students, the programs targeting K-12 students are limited. The limited number of programs targeting K-12 students are focusing on attracting students to the construction industry in general without specifically focusing on attracting them to pavement construction and paving worker positions. In addition, most of the programs do not have a scientific data collection component in which the opinions of the students and teachers are periodically collected and monitored to determine the effectiveness of the program and to provide improvements to address the received feedback from them. The success of those programs is generally not monitored by evaluating the career choices of K-12 students after graduation. For all those reasons, a comprehensive educational program with technology demonstration and feedback acquisition components needs to be developed and implemented to attract the attention of new generations to the paving industry.

2. Document how this **transportation issue** is important to Oregon and will meet the [Oregon Research Advisory Committee Priorities](#)

The skilled paving worker shortage issue is directly impacting the construction schedules of ODOT, cities, and counties in Oregon (and many other states). In addition to delays in construction schedules, paving costs are also increasing as a result of the continuously increasing wages. In addition, the reduction in the number of skilled workers is expected to reduce the quality of construction and the performance of the pavements in the long run. Construction is the most challenging and critical stage in the pavement life cycle to achieve long-lasting pavements. Performing the best research and development activities, purchasing the highest quality construction and test systems, recruiting the best pavement engineers, and having the best pavement management systems and strategies can never result in the highest quality pavement systems unless construction is done properly by highly skilled workers. Without high-quality construction, contributions of advances in pavement engineering will never be visible.

Without having any information about the benefits and the technologies used during pavement construction, most high school graduates who could have become skilled workers in the paving industry choose to work in other fields. By reaching out to K-12 students and educators, the benefits of working in the paving industry and the technology-based paving procedures in today's world should be clearly conveyed to the younger generations. The suitability of today's paving industry for female workers should also be emphasized in order to reduce the current gender gap, which will ultimately lead to an increased number of skilled workers in the industry.

This proposed research study clearly addresses the *“Economic and community vitality”* goal of the Oregon Transportation Plan (OTP) by directing more people to pavement construction jobs. The proposed research study also addresses the *“Equity”* and *“Workforce Development”* priorities of the Oregon Research Advisory Committee.

This research and development project is expected to support the first three goals of the Equity component of ODOT's Strategic Action Plan, which are: i) *“Build a diverse workforce...”*, ii) *“Promote economic opportunity for Oregonians...”*, and iii) *“Utilize the viewpoints of those who reside in the communities ODOT serves...”*

**3. What final product or information** needs to be produced to enable this research to be implemented?

This research and development project will produce and implement a program with technology and instructional components to attract the attention of K-12 students to pavements and pavement engineering. Implementation of this program (either solely by ODOT or by ODOT in collaboration with the university and industry partners after the development) is expected to help reduce the skilled paving worker shortage issue and the associated problems.

**4. (Optional)** Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

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Chris Duman	Pavement Quality & Materials Eng.	<a href="mailto:Christopher.L.DUMAN@odot.oregon.gov">Christopher.L.DUMAN@odot.oregon.gov</a>	(503) 559-4994
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**5. Other comments:**

In this proposed research project, the following scientific process will be followed:

- **First step:** Connect with several educators from K-12 schools in Oregon to describe the planned program and collect their feedback through surveys.
- Development and preparation of technologies related to pavements to attract the attention of K-12 students. The potential technologies that are going to be developed and demonstrated are:
  - Virtual Reality (VR) construction and material production environments that can be accessed with VR headsets
  - Laser texture scanner for surface profile demonstration, inertial profiler demonstrations for pavement roughness measurement, and Falling Weight Deflectometer (a portable pavement test system on a trailer applying truck loads to pavements) demonstrations
  - Construction Quality Assurance (QA) technologies developed at OSU
  - Drones used for pavement distress measurement and evaluation
- Simple example pavement design and performance evaluation projects to be developed and completed with the students.
- Several invited talks with speakers from ODOT and the industry (mostly construction workers from various age groups and different genders).
- Organizing visits to pavement laboratories across Oregon for research-related demonstrations to provide a better understanding of pavement systems.
- Conducting periodic surveys with students and teachers to determine the effectiveness of the program and identify areas that can be improved.
- **Final step:** Implement the final program and develop a process to monitor the construction and pavement-related job placement rates of the graduated high school students to quantify the effectiveness of the program.

**6. Corresponding Submitter's Contact Information:**

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