

PROJECT INFORMATION

Project Director's Name*	Stephanie Payne
Organization*	Texas A&M University
Project Title*	EMPOWER Safety Dashboards: Evaluate, Measure, and Promote Offshore Worker Engagement and Readiness
Reporting Period*	12-01-22 to 08-31-23

Note to Grantees: In sections 1 to 5, we ask you to highlight your accomplishments (including outputs and outcomes) through this grant award. These sections of the final grant report will be made available to the public.

1. GOALS AND ACCOMPLISHMENTS

1.1 Please restate the goals and objectives of your project.*

Aim 1: Gather daily safety culture and readiness data, from at least one sample of oil & gas operators (workers) to determine how frequently they change. (Studies 1 and 2)

1.1 Obtain employee readiness data and safety culture assessment measurements in a longitudinal naturalistic study

1.2 Evaluate the operationalizability (efficacy/usability/adoption/readiness) of the new measurement tools

Aim 2: Develop the EMPOWER dashboard to display safety culture and readiness data

2.1 Identify contextual and stakeholder (supervisors) requirements for EMPOWER implementation through focus groups.

2.2 Using data from Aim 1, develop the EMPOWER dashboard prototypes via a user-centered approach

Aim 3: Evaluate and improve the impact of the EMPOWER dashboard on supervisor decision making in hypothetical offshore scenarios

3.1 Evaluate the impact of EMPOWER dashboards on supervisor decision making in simulated offshore operations.

3.2 Develop recommendations for refinements in preparation for deploying the EMPOWER dashboard

1.2 Describe the accomplishments of your project. You should include both the anticipated accomplishments that you outlined in your project proposal as well as any *unanticipated* accomplishments that have since occurred. Describe any activities you have conducted, programmatic progress made, or project benchmarks and milestones met.*

We completed two data collections off-shore. Each time we followed a sample of approximately 30 offshore workers over the course of a 28-day hitch. We gathered multiple fatigue measures and daily assessments of safety culture. We used these data to populate a beta version of a dashboard.

2. Outputs

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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** denotes required fields*

2. OUTPUTS

Outputs are tangible or measurable deliverables, products, data, or publications produced during the project period.

2.1. Please indicate the number of students (K-12, undergraduate, or graduate), postdoctoral scholars, citizen scientists, or other trainees involved in the project. *

Please enter 0 if none were involved.

K-12 students	0
Undergraduate students	3
Graduate students	6
Postdoctoral scholars	1
Citizen Scientists	0
Other Trainees	0

2.2. Has your project generated any data and/or information products? *

Generation of data includes transformations of existing data sets and generation of data from existing resources (e.g., maps and images). Information products include publications, models, software, code, curricula, and digital resources.

(Check all that apply.)

Responses Selected:

Data
Information Products

2.3. Briefly describe how you fulfilled the approved Data Management Plan and, if applicable, any changes from the approved plan. *

As instructed, we uploaded our data file and code book to GRIIDC.

If your project has generated data, please download the Excel worksheet entitled [GRP Data Management Reporting](#). Use the “Data Report” tab in the worksheet to create an inventory of data sets that you produced and to verify deposit in a curation facility. Upon completion, please upload the worksheet to your task list. If you need guidance on how to complete the Data Report, please e-mail gulfgrants@nas.edu. A member of GRP’s data management staff will reach out to you.

If your project has produced publications, websites or data portals, GIS applications, models or simulations, software packages or digital tools, code, curricula, or other interactive media, please download the Excel worksheet entitled [GRP Information Management Reporting](#). Use the “Information Products Report” tab in the worksheet to create an inventory of these products and to verify deposit in a curation facility. Upon completion, please upload the worksheet to your task list. If you need guidance on how to complete the Information Products Report, please e-mail gulfgrants@nas.edu. A member of GRP’s data management staff will reach out to you.

2.4. Aside from data and information products, what other tangible or measurable deliverables or products (e.g., workshops, trainings, and outreach events) were produced during the project period? *

Upon completion of this form, you may upload supplemental material that represent the tangible or measurable deliverables or products to complement this narrative report.

We have given multiple presentations and have multiple manuscripts submitted for publication.

Dumlao, S. V., Payne, S. C., Zhang, B., Mehta, R. K., Sasangohar, F., Kang, J. & Wang, X. (2023, April). Investigating the day-to-day stability of safety climate. S. V. Dumlao & S. C. Payne (Co-Chairs), & J. M. Beus (Discussant). There is nothing so stable as change: Safety climate across multiple points in time [Symposium]. Society for Industrial and Organizational Psychology Annual Conference, Boston, MA, United States.

Payne, S. C., Dumlao, S. V., & Ji, H. (2023, April). Safety climate and worker fatigue on workplace safety [Poster]. Society for Industrial and Organizational Psychology Annual Conference, Boston, MA, United States.

Dumlao, S. V., Payne, S. C., Kang, J., Zhang B., Mehta, R. K., Sasangohar, F., & Wang, X. (2023, June 23). EMPOWER Safety Dashboards: Evaluate, Measure, and Promote Offshore Workers Engagement and Readiness. Final technical report focusing on safety culture submitted to the National Academies of Sciences, Engineering, and Medicine.

Kang, J. (2023, October 23-27). Impacts of rotating shiftwork on offshore worker fatigue levels and associated adaptations. Presentation at the Human Factors and Ergonomics Society International Annual Meeting. Washington, DC.

Kang, J., Payne, S. C., Sasangohar, F., & Mehta, R. (under review). Field-based longitudinal evaluation of multimodal worker fatigue assessments in offshore shiftwork. *Applied Ergonomics*.

Kang, J., Chang, A., Wang, X., Payne, S. C., Sasangohar, F., & Mehta, R. (under review). Perceived utility, effectiveness, feasibility and compliance of daily fatigue assessments among offshore shift workers. *Process Safety and Environmental Protection*.

Kang, J., Payne, S. C., Sasangohar, F., & Mehta, R. (under review). The impacts of rotating shiftwork on worker fatigue levels and associated adaptations: A naturalistic study across offshore platforms in the Gulf of Mexico. Paper submitted to *Human Factors: The Journal of the Human Factors Ergonomics Society*.

Wang, X., Payne, S. C., Mehta, R., & Sasangohar, F. (under review). Safety culture and worker fatigue

management in the offshore oil and gas industry: An interview study. Journal of Loss Prevention in the Process Industries.

Kang, J. (2023). Longitudinal evaluation of multimodal worker fatigue assessments in offshore shiftwork. Dissertation. Texas A&M University, College Station, TX.

Dumlao, S. V. (2023). There is nothing so stable as change: The day-to-day stability of safety climate in the offshore oil and gas industry. Dissertation. Texas A&M University, College Station, TX.

3. Data Management

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** denotes required fields*

3. DATA MANAGEMENT

In this section, please provide a response to each question to complement the **Data Report** in the GRP Data Reporting Excel worksheet.

3.1 If you listed multiple data sets in the data reporting table, please briefly describe how these data sets relate to one another. *

1 integrated data set has been uploaded to GRIIDC

3.2. Please provide a list of additional documentation to describe the data listed in the reporting table (e.g., code books, lab manuals, workflow procedures). Enter none if you did not produce any additional documentation to describe the data. *

An Excel file labeled manual has been uploaded to GRIIDC

3.3. Beyond depositing data and metadata in a repository, what other activities have you undertaken or will undertake to ensure that others (e.g., researchers, decision makers, and the public) can easily discover project data? What other activities have you undertaken to ensure that others can access and re-use these data in the future? *

We have made numerous presentations about the project at multiple conferences, to organizational stakeholders and to professional associations.

3.4. Are any data products you produced sensitive, confidential, and/or proprietary? *

No

4. Information Products

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4. INFORMATION PRODUCTS

In this section, please provide a response to each question to complement the **Information Products Report** in the **GRP Information Products Management** Excel worksheet.

4.1. Please select the type(s) of information products that your project produced. *

Responses Selected:

1. Scholarly publications, reports or monographs, workshop summaries, or conference proceedings

Scholarly publications, reports or monographs, workshop summaries, or conference proceedings *

Please provide a list of citations for project publication, reports and monographs, workshop summaries, and conference proceedings.

Dumlao, S. V., Payne, S. C., Kang, J., Zhang B., Mehta, R. K., Sasangohar, F., & Wang, X. (2023, June 23). EMPOWER Safety Dashboards: Evaluate, Measure, and Promote Offshore Workers Engagement and Readiness. Final technical report focusing on safety culture submitted to the National Academies of Sciences, Engineering, and Medicine.

4.2. Beyond depositing information products in a repository, what other activities have you undertaken or will undertake to ensure that others (e.g., researchers, decision makers, and the public) can easily discover and access the listed information products? *

We presented our research at multiple conferences.

4.3. Are any of the information products you produced confidential, proprietary, or subject to special license agreements? *

No

5. Project Outcomes

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5. PROJECT OUTCOMES

Outcomes refer to the **impact(s), consequence(s), result(s), or effect(s)** that occur from carrying out the activities or outputs of the project. Outcomes may be environmental, behavioral, health-related, or programmatic. Example outcomes include, but are not limited to: increased learning, knowledge, skills, and motivation; policy changes; actions taken by a group as a result of information generated by your project.

5.1. Please describe the outcomes achieved during your project and how they were assessed. For this question, we are interested in learning about the immediate short-term outcomes that have already occurred during or as a result of your project. Do not include long-term outcomes you foresee your work contributing to beyond the end of the project. *

Kang, J. (2023). Longitudinal evaluation of multimodal worker fatigue assessments in offshore shiftwork. Dissertation. Texas A&M University, College Station, TX.

Dumlao, S. V. (2023). There is nothing so stable as change: The day-to-day stability of safety climate in the offshore oil and gas industry. Dissertation. Texas A&M University, College Station, TX.

5.2. We're interested in hearing not just the results of your project but what are their implications for or contributions to:

- offshore energy system safety,
- environmental protection and stewardship, and/or
- health and community resilience

Please describe what you consider to be the most remarkable accomplishment or finding of your project. What can others learn from your accomplishment and finding? How do you see it fitting in with your greater field of study or community of practice? *

This is the first study examining safety climate/culture on a daily basis in any industry. We demonstrate the value of doing so and make recommendations about the measurement of safety climate going forward.

6. Communication

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Note to Grantees: In Section 6, we seek input from you to help us evaluate the Gulf Research Program's funding strategy. This section will not be made available to the public.

6. Information to Inform GRP Evaluations

6.1. Sharing the difficulties you encountered helps us learn from your experience. Describe any challenges you encountered in your project and how you addressed or overcame them. Challenges are inherent to conducting any complex project. These may include (but are not limited to): unexpected staffing changes, changes in the community you are working in, appearance of a new technology or dataset in the field you are working in, challenges accessing a field site, policy or regulatory changes that affect the issue you are addressing, low recruitment rates, delays in setting up services, or other problems in implementing and conducting your project. *

Gaining access to off-shore workers required developing relationships with industry partners. Intense daily data collection required 1-2 researchers to leave their families and day-to-day lives for over two-week time periods, to isolate in the middle of the Gulf of Mexico and work 18-hour days. Working in interdisciplinary teams requires extensive project management and communication.

6.2. We like to hear about what you learned from your work and how you feel it affects future work or the work of others. Think back on your project strategies, methods, and activities, what worked and what did not? Is there anything you would do differently in the future? If so, tell us what and why. *

We learned how important it is to have statistical/analytical support to analyze complex repeated-measures data. We learned that safety culture is relatively stable over the course of a hitch, but we would randomize survey items in the future. We learned that various fatigue measures do not relate well to one another.

6.3. What are the next steps for this work, either for you and your project team or other researchers? Has this project led to other opportunities to work in this area? *

We are very excited to be awarded a second GRP grant to continue our work, improving fatigue management systems, measuring safety culture over time, and developing a dashboard of real time worker readiness data.

6.4. Have you developed new collaborations or partnerships (formal or informal) as a result of this work? If yes, please describe the new collaborations or partnerships. *

We did develop a relationship with Bo Zhang, a quantitative psychologist.

6.5. What, if any, positive changes in policy or practice do you foresee as a result of your work? *

Ideally, drilling companies will consider measuring safety culture and fatigue more systematically to ensure worker readiness.

6.6. If you could make one recommendation to the Gulf Research Program for how best to build on the work you conducted in this project, what would it be? *

To measure safety culture consistent with the research literature: by gathering workers' perceptions. (not through safety audits)

7. Communication and Dissemination

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Note to Grantees: In Section 7, we ask you to help us communicate the importance, progress, and accomplishments of your work. Information provided in this section will be used by the Gulf Research Program to highlight its funded projects in print and electronic informational and promotional materials. The intended audience for the information provided in this section is different and should be thought of as a general audience. When you return to the dashboard, you may upload images that represent and illustrate the work of your project.

7.1. Please describe the most exciting or surprising thing you have learned while working on this project in a way that is understandable by a general audience. *

Working off-shore is a considerable sacrifice for the workers and they are willing to contribute to research.

7.2. Do you have any stories that capture the impact of this project? (optional)

If so, please share one or two. Examples of what we are interested in include stories of people/communities that the project has helped; lives that have changed; work that led to policy change, such as legislation or regulation; and research breakthroughs.

(No response)

7.3. Have any communications, outreach, or dissemination activities occurred in relation to your project?*

Please describe:

- Any press releases issued (other than that issued by the National Academies of Sciences, Engineering, and Medicine) about the project.
- Any media coverage or news stories about the project.
- Any social media accounts, websites, listservs, or other communication vehicles used to communicate information about this project. Please include relevant web addresses if available.

nothing beyond what we previously mentioned