**Check One: ☐Project ☒Review ☐Collaboration**

**☐Workshop ☐Other**

| **Descriptive Title** | Dust emission mechanisms and mitigation |
| --- | --- |
| **Working Title[[1]](#footnote-0)** | Dust emission |
| **Technical Area[[2]](#footnote-1)** | Dry Systems – DS |
| **Date** | June 2025 |
| **Short Description** | A comprehensive review of the **mechanisms driving dust release** from bulk or powder systems in industrial processes, along with the deposition and subsequent re-release of dust from surfaces. Furthermore, we want to review state-of-the-art **strategies for mitigating dust emissions**, identifying the most effective strategies and highlighting gaps in current knowledge that could inform future research and innovation in the field. |
| **Objectives** | * To deepen the understanding of the physical mechanisms behind dust generation and release. * To assess and compare existing dust mitigation technologies. * To identify knowledge gaps and propose directions for future research and industrial application. |
| **Scope** | Dust emissions from powders and bulk solids represent a significant challenge across various sectors, including material manufacturing, biotechnologies, pharmaceutical and food industries. Extensive research exists in the literature on release of dust from granular materials, along with some technical solutions to mitigate dust emissions; Further exploration is needed.  The review should focus on state-of-the-art understanding of the dust release mechanisms from powders and bulk solids, as well as the deposition and subsequent release of particles from surfaces.  Not in scope of this review is particle movement post-release or the health impacts of dust exposure.  Specifically, the review should include the following:   1. **Mechanisms of dust release from bulk and powder** including the influence of particle parameters that affect dust release as well as meteorological parameters, e.g. temperature, humidity, wind speed and precipitation. 2. An overview of existing **mitigation technologies** to control dust release from powders and bulk solids, including an evaluation of the most effective approaches.   In addition, we would encourage the identification of knowledge gaps based on the review findings, which could serve as a foundation for future impactful projects in our research community.  To ensure comprehensive coverage, this review may be co-authored to address all relevant aspects thoroughly. |

| **Recommended Contractors** | | |
| --- | --- | --- |
| **Name** | **Institution** | **Email Address** |
| Martin Morgeneyer | Université de Technologie de Compiègne | martin.morgeneyer@utc.fr |
| Nathalie Manowald | Cornell University | mahowald@cornell.edu |
| Max Zhang | Cornell University | kz33@cornell.edu |
| Mojtaba Ghadiri | Leeds University | M.Ghadiri@leeds.ac.uk |
|  |  |  |

| **Submitted By:** | |
| --- | --- |
| **Name** | **Organization** |
| Edouard Izard | ArcelorMittal |
| Simon Greener | P&G |
| Isabelle Deleris | Cargill |
| Martijn van der Hoeven | Danone |
| Jarrod Hart | Immerys |
| Alexander Findeisen | Novoneis |

Comments:

Geotechnical knowledge translated into applicable industrial perspectives might be a good opportunity.

1. Title used in meeting agendas and file archives [↑](#footnote-ref-0)
2. One or more from the following list: W = wet systems; D = dry systems; F = particle formation; SR = size reduction; M = modeling; SE = systems engineering [↑](#footnote-ref-1)