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Understanding Grain Pneumatic Conveying in Seeding Equipment

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Summary
The project is aimed at developing a better understanding of pneumatic seed conveying; that understanding is lacking in the design and operation of air seeder, particularly when considering machines with wider toolbars and handling widely differing seed types.

A combination of experimental testing and numerical modeling is planned to build the incremental knowledge required to build an understanding of the pneumatic system in terms of how its operational variables affect its performance. The performance of the system is ultimately measured in terms of evenness of seed distribution and level of damage to the seed.

Objectives
The specific objectives of the project are:

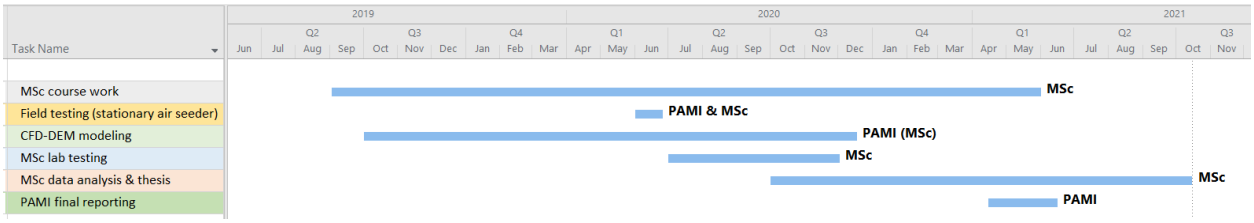
(1) Collect data on the performance (seed distribution and seed damage) of a pneumatic seeding system.

(2) Develop CFD model to simulate selected components of a pneumatic seeding system.

(3) Develop coupled CFD-DEM model to simulate selected components of a pneumatic seeding system.

(4) Analyze the project results in the context of increasing seeding system performance for producers.

General Timeline
The project represent an excellent opportunity for HQP training. As such, the planned timeline is centered on the engagement of a graduate student (MSc).



The illustrated timeline is not intended to indicate target dates for deliverables, but it provides the general flow of activities. The graduate student is expected to start his/her program in September 2019. It is noted that PAMI's modeling effort will precede the field and lab testing

activities. As such, modeling results can guide the experimental phase and add significant value to it. It is also noted that the student will be involved in numerical modeling as much as appropriate and practical.

With fiscal years starting in April and ending in March, the proposed timeline results in the project spanning three fiscal years:

- Project Year 1 (September 2019 to March 2020) → FY 2019-20
- Project Year 2 (April 2020 to March 2021) → FY 2020-21
- Project Year 3 (April 2021 to October 2021) → FY 2021-22

Funding

The project is funded by SaskCanola and Manitoba Agriculture. Both partners have confirmed their funding support to a maximum of $93,725.00 (total project budget of $187,450.00).

The research team intends to apply project expenditures to each funder to leverage their respective requirements. As such, PAMI labour will be applied against the SaskCanola funding; hard costs and student stipends will be supported by funds from Manitoba Agriculture.

Also, we are targeting alignment between the budget and the proposed timeline (3-year project). Agreement on the project/budget duration as well as the acceptability of carry-over between years will be required from all parties.