

Summary

In 1982, J.A.Ottjes wrote his PhD thesis on the mechanics of dilute phase particle transport (Ottjes, 1982). He used the calculation model presented in his thesis for a digital calculation program, named Pneu. Pneu enables the user to calculate the performance parameters of a dilute phase transport system. As a result of rapid digital development since 1982, Pneu became outdated.

The development of a program, based on the same calculation model, but with a more user friendly windows user-interface and a possibility to plot different outcomes in graphs was desirable.

The main research assignment discussed in this report is the design of a computer model to calculate installations for dilute phase pneumatic pipe transport. The computer model has to be able to automatically both (1) calculate specific operation point parameters and (2) plot output graphs as a result of multiple inputs.

The developed program was called DPT (Dilute Phase Transport). DPT is a window based program, using the Delphi object orientated language. The differences and resemblances in functionalities between Pneu and DPT are shown in the table below.

<i>Comparison functionality Pneu and DPT</i>		
	PNEU	DPT
Single input/output	•	
Variable input/output		•
Warnings to prevent system malfunction	•	•
Output in numbers	•	•
Excel compatible output		•
Graphical output		•
V_stop calculator		•

The figure on the next page shows the schematic overview of DPT. As a result of variable input parameters, the output parameters are also variable. This enables the user to plot the output parameters against the selected variable input parameter. For example, if the user chooses the pipe diameter to be variable, the output parameter engine power can be plotted against the pipe diameter. Additionally, all data can be exported to Excel to study the specific operation point parameters. Since the calculation model in Pneu made use of three different calculation theories, DPT's output consists of three different outcomes. These outcomes are plotted in the same graph other to illustrate the accuracy of the results.

Since DPT is based on the same calculation model as Pneu, there are no numerical differences in outcome. Compared to Pneu, DPT offers (1) more user-friendliness and (2) enables different types of outputs and without losing the essential information provided by Pneu.

