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The Effect Of Die Thickness

Pellet compression takes place within the die of the pellet mill. There are various factors to consider when choosing the right die for your raw material. One of those factors is the thickness of the pellet mill die. This guide will discuss the positives and negatives of a thicker pellet mill die.

Thank You For Your Continued Interest

Hopefully through the previous guides you can appreciate how making quality pellets with minimum energy consumption and maximum productivity is a true skill. Well the information doesn't stop there, we continue with what effect the thickness of the pellet mill die has on pellet quality and productivity. Understanding these principles is crucial for competent quality pellet production.

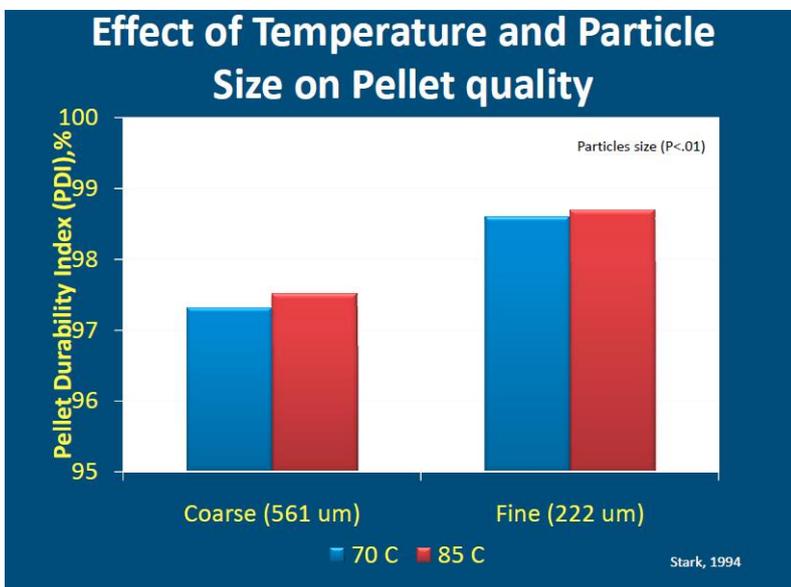
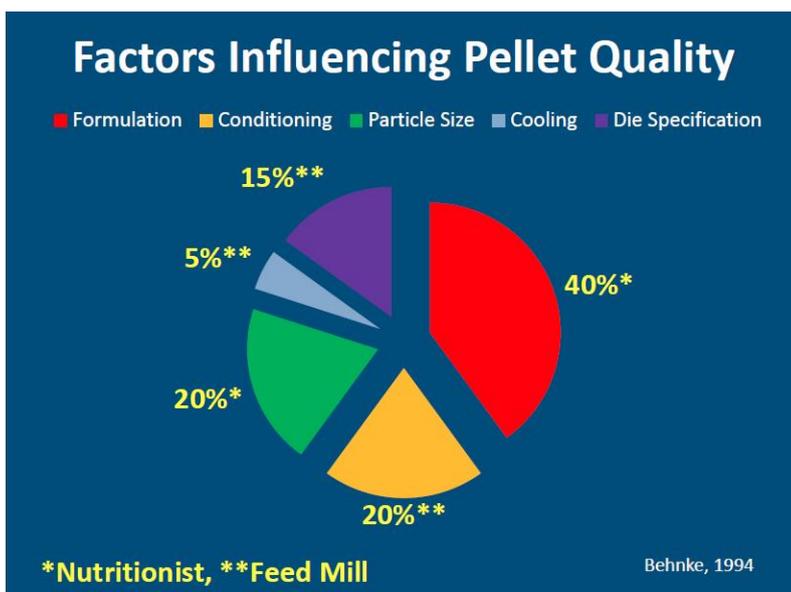
1 The Study By C.R. Stark On The Effects Of The Thickness Of The Pellet Mill Die

From our own experiences in pellet production we have seen the various effects the thickness of the die has on pellet mill productivity and pellet quality. However, one of the most comprehensive studies was conducted by C.R. Stark at North Carolina State University. This study focuses on animal feed production, however the same principles also apply to fuel pellet production.

What Influences Pellet Quality?

The study starts with an introduction in to what factors affect pellet quality. You will recognize some of these factors from the previous guides, for instance particle size and formulation with regards to material moisture content. As you can see in this particular example 15% is allocated to the influence of the die. However this is for producing feed pellets in a feed mill. The percentage for wood pellets and other biomass fuel pellets will differ slightly.

As you can see in the second graph, as discussed in previous guides pellet quality is influenced by the size of the particle and by the temperature at which the pellet is formed. Most pellet mills currently sold on the internet have a die designed to process animal feed, and do not generate a compression sufficient to generate the heat required to produce a quality fuel pellet with sufficient density. Also as you can see a finer particle size and increased temperature can produce a better quality pellet, to a certain extent.



2 Setting Up The Experiment

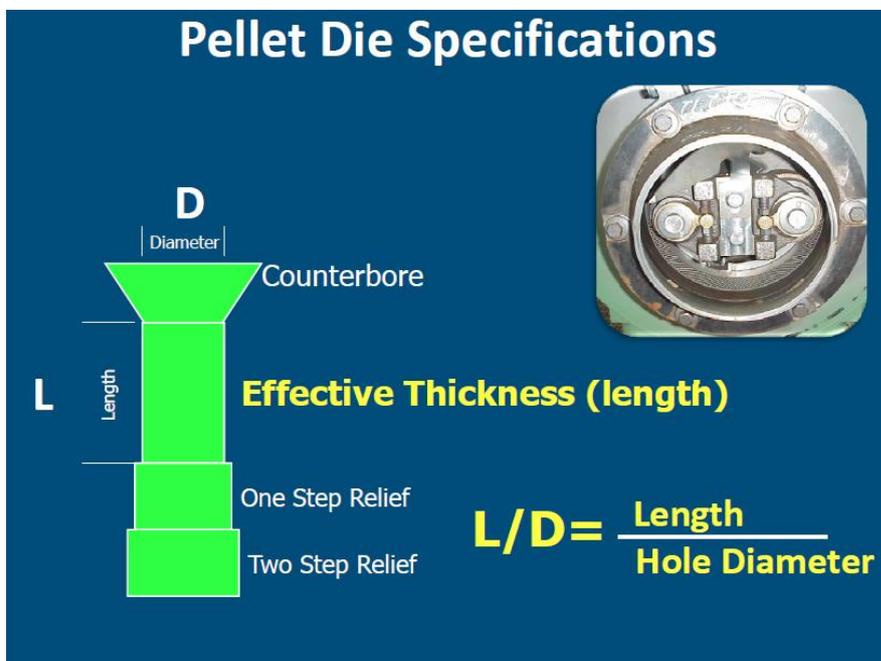
The study monitored several aspects of the pellet production process. Before the material was put through the pellet mill it was first run through a conditioner for 20 seconds at 83 degrees Celsius.

Die Thickness

The material will then be run through three dies, all with 4mm holes. The thickness of the dies were 29mm, 35mm and 44mm. As you can see from the slide to the right, the depth of the die and the actual effective thickness are two completely different things.

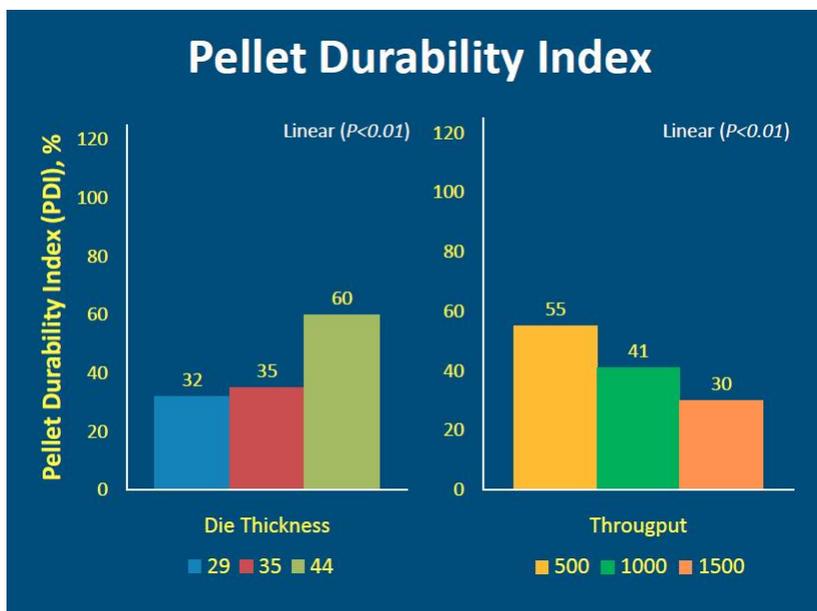
Pelleting Production Rate

The die on the pellet mill was run at different speeds to produce a productivity of 500Kg/h, 1000Kg/h and finally 1500kg/h.



The Results

Several variables were monitored including production rate and pellet mill efficiency, but the most significant factors were the effects to pellet quality. As you can see a thicker die produced a much higher quality pellet. Likewise, the higher the speed of the die the lower the pellet quality. Therefore to be able to control pellet quality you need the right die and to be able to control the speed of the die. Many pellet mills have the wrong dies and are single speed. Therefore it is very difficult to control pellet quality.



The Complete PelHeat Pellet Production Guide

This guide should have started to make you aware of how crucial the quality of the pellet mill die really is. To learn more, please purchase the Full PelHeat Guide. If you are not completely happy with your purchase I will provide you with a 100% refund, no questions asked. Thanks for reading!

Chris