



Dust Plow

Why A Dust Plow?

The return of dust from a dust collection system to a bulk handling facility is a consideration that has suffered widespread neglect in the vast majority of systems. Why? There are two basic answers:

- Inexperience. Inexperience has led to the complete failure to give any consideration whatsoever to “dust return” in the design of many systems.
- Lack of Money. Assuming an acknowledgment of the need to deal with “dust return” in the face of a low budget, the subject has been pigeonholed as nonessential and put in a file for future consideration. This is somewhat understandable in the view of the very real expense historically associated with the problem.

For these reasons little or nothing has been done to address the problems associated with “dust return” in what we estimate to be about 75 percent of the bulk handling systems equipped with dry dust collection.

What are the problems associated with “dust return?” If dust is simply dumped right back on top of the product several problems can result.

- Visible dust is produced at the point of return, which usually represents a violation of EPA, MSHA, or OSHA regulations. Perhaps more important, the loss of product and cleanup time represents a great deal of money.
- Enclosed conveyor galleries, subsequent to the point of return, can develop a hazy buildup of dust. The speed of the conveyor, often well above 600 feet per minute (fpm), has a tendency to lift the very fine dust off of the conveyor and into the atmosphere of the gallery. This can result in regulatory violations and high cleanup and maintenance costs.
- When handling coal or grain the above problems are also hazards. The right combination of air, dust, and spark can cause an explosion and/ or fire, something that everyone would like to try to avoid.

- When dust is collected and then returned to the conveyor belt it is returned in an essentially “concentrated” form. That is to say the dust was always in the product in a “dispersed” form, but when it is returned it is “concentrated” together. At the next conveyor transfer or normal dust producing source, the “concentrated” dust is much more readily captured and collected by the dust collector serving that area. Often it is the same collector. This means that unless designed for, which is not the case most of the time, the dust loading to the collector can be many times what was anticipated. Usually the result is a higher than expected drop across the filter bags of the collector. This in itself may not sound like a major problem but it causes a couple of additional problems:
- Because the fan of the dust collection system sees a higher pressure drop than intended, it cannot pull the full volume of air in which it was sized to handle. This results in reduced draft at the pickup point and subsequent loss of dust control. This is obviously undesirable and leads to higher clean up and maintenance costs.
- The reduced volume of air being handled results in lower velocities in the duct system often to levels below the “carrying” velocity of the dust. This means that the dust can “drop out” within the duct. “Drop out” is not only a hazard with coal and grain, but is also the cause of much expense of time and money when it comes to cleaning out the entire duct system. Furthermore, while it is standard practice in theory to design duct supports for ducts full of dust, in reality, many are not for one reason or another. This is another safety hazard.

These are the major problems associated with “dust return.” The next step is to look at the options available for dealing with these problems. There are several which fortunately or unfortunately, depending on your point of view, have been plagued with expense, poor performance, and/or very high maintenance. They include the following:

1. *Briquetters* – These are large, very costly machines that compress the dust under extremely high pressure to make large solid pieces, often the shape of a large capsule. The briquettes are still often fragile and readily broken down again. This is by far the most expensive approach to “dust return”. There are relatively few installations because of the high initial cost. Further, there is a high operating cost in the form of power consumption and maintenance. In addition to the machine itself, holding bins and auxiliary dust handling equipment are usually necessary.

2. *Pug Mills or Conditioners* – These are either single or double flight screw conveyors or mixers which are used to wet the dust using either plain water or water with a wetting agent or binder type of chemical. They are relatively expensive for the basic capital equipment. They are often high maintenance and have operation costs when chemicals are used. In addition they are subject to freezing in the northern climates and much added expense is involved in protection against this element. Even then their reliability leaves much to be desired; they are easily plugged, and unless the feed rate is very carefully controlled, the dust can be over wetted causing various additional problems in bins and chutes.
3. *Pneumatic Conveying Systems* – Some bulk handling systems take the dust from the collectors. Rather than returning it to the system at numerous points they pneumatically convey it to a central point where it can be returned to the system, usually at the very end of the handling cycle. Conceptually, this is a good approach; if you don't handle the dust, you won't have any of the problems discussed above. However, pneumatic systems are also quite expensive involving blowers, rotary air locks, tanks, special piping (which can run all over the plant), and usually a final receiver vessel with another bag house. High cost and the maintenance associated with all of the equipment involved counteracts the benefits of the conceptual approach.
4. *Dust Boxes* – These are fabricated boxes with internal cones over which the dust is dropped. The cone spreads out so a more effective attempt can be made to wet the dust with water or chemically treated water. Sprays are mounted on the box and are activated with the flow of dust. They have a tendency to build up with accumulated mud as well as freeze up in cold climates. Further, their performance has yet to be successfully demonstrated on a sustained basis.

Until recently, in addition to doing nothing, these were the options available for dealing with “dust return.” Now there is a **Dust Plow**. Why a **Dust Plow**?

- It reduces visible dust at the point of return.
- It reduces dusting in subsequent conveyor galleries caused by “lift off”.
- It reduces the recirculation of the returned dust into the dust collection system.
- It saves several times its cost in one year from reduced cleanup and maintenance.
- It is **guaranteed** or a full refund is provided.

Why a **Dust Plow**? Because the **Dust Plow** truly is **Today's Standard Method of Dust Return**.