

Mud and Trash Handling

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Upon the advent of beet loaders in the early forties the processors' difficulties, as far as handling beets were concerned, mounted by leaps and bounds. Such loaders not only picked up the beets but rocks, hard clods and trash as well. A-frames accomplished some good when properly used but usually the frame was not any wider than the loading frame and clods and rocks were picked up from the sides. Experience with these loaders clearly demonstrated the fact that once beets were **lifted out of the ground they should never be put back on the ground.**

Clods from heavy soils were not screened out by receiving equipment and were flumed with the beets. In many locations these clods, absorbing some water and traveling in the flumes, became balls ranging in size from 1/2 inch to 12 inches in diameter. Clods which broke down filled the flumes with mud and the customary manner of fluming beets became obsolete.

To overcome these difficulties various methods were used from plows to jets in the bottoms of the flumes and armies of men with forks and pieces of pipe lined the flumes. Still the slicing capacities suffered both due to our inability to get sufficient beets into the beet hoppers and poor cuttings caused by mud, rocks and trash in the cutters. It was obvious that our beet handling equipment was entirely inadequate and major changes were necessary.

In 1945 at the Hardin, Montana, factory a continuous rock catcher was installed in place of the conventional Franklin rock catcher and a flume-flushing system developed. The rock catcher consisted of slat buckets on conveyor chains continuously passing under a section of the flume. These buckets were carried up over the flume and discharged on a belt carrying the mud balls and rocks outside the factory. A 10 inch header was run to the sheds and flumes supplying water to jets and a flume-flushing system. A 1,600 gpm. pump having a 200 foot head driven by a 100 HP motor supplied the water under high pressure.

After the 1945 campaign we found that such measures still did not solve our problems. We could not get enough beets into the factory to keep up slicing capacity. It was clear that we had to redesign the entire beet sheds and flumes, which was done the following year. Steel sheds were built having a 5 percent grade in the steel flumes and an entire rearrangement of flushing system made with jets in the shed flumes, header and flumes to the factory. Fire hose connections were placed at strategic locations where stoppage might occur. The 1/2 inch jets placed in the flumes on 18 inch centers at 45° angles looking down stream were very effective and we found that steel flumes lend themselves to much easier cleaning than cement ones.

The rocks and mud balls mentioned above were conveyed outside of the factory where they were handled with a crane and dump truck. In a short time great mounds of this material accumulate and in the last campaign we had as many as 3,750 tons piled in the yard waiting for removal with dump trucks.

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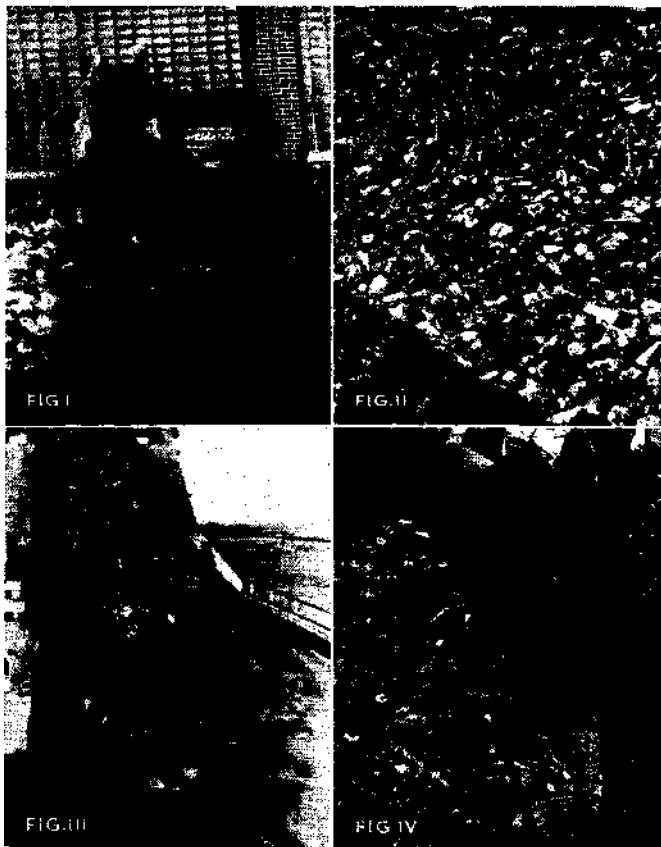


Figure 1.—Mud and mud balls being discharged from continuous rock catcher.

Figure 2.—Beets and mud as flumed from beet shed.

Figure 3.—Beets and mud being conveyed to sheds.

Figure 4.—Beets and mud in beet sheds.

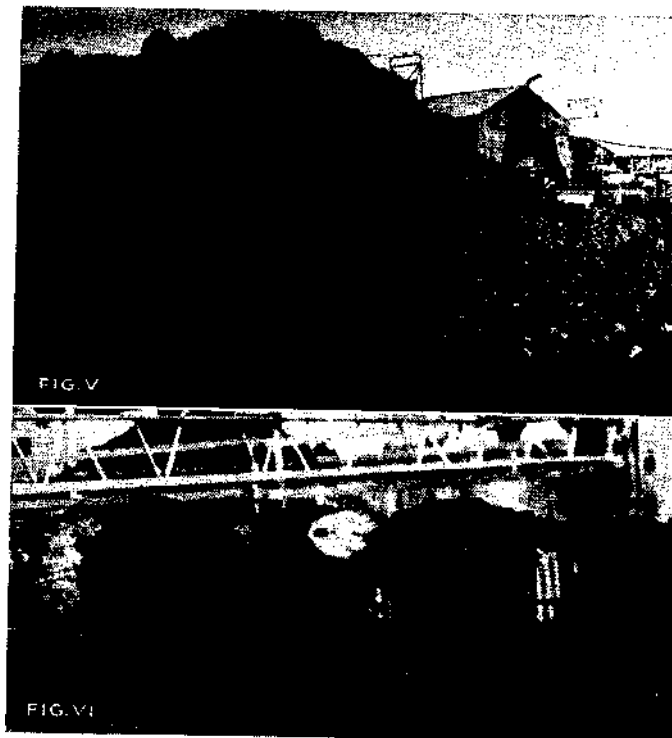


Figure 5.—Some of the accumulation of rock catcher discharge.

Figure 6.—Some individual beets as received, covered with frozen mud.

Typical tares in this area are as follows: 20 percent avg tare for an entire district with some dumps running as high as 25 percent and individual loads as high as 70 percent. Some growers have averaged from 37 percent to 46 percent for their entire crop.

Trash consisting of grass and roots not removed at the receiving station aggravates the situation as well, but other than to install additional trash catchers of the conventional design we have done nothing new except close in the sprocket drive end of the rake drag **with** either perforated **metal**

or sheet steel to hold the trash hooks in a horizontal position as they travel up over the head end of the trash catcher. This has been very effective in retaining trash on the hooks after it leaves the flume stream.

During the last campaign conditions in Montana seemed to get worse and we now find additional grade necessary in the flumes from the sheds and wet hopper to eliminate extra labor and keep the factory operating to capacity. Flumes with 4 to 6 percent grade will probably be necessary to accomplish this.

In the Imperial Valley where soil depths are up to 1,200 feet in thickness no rocks exist but considerable loss in slicing time was experienced due to rocks and tramp iron brought in with car beets and we are installing a conventional rock catcher this year.

Beets harvested with harvesters presented another problem in the Imperial Valley as large tonnages of beets are delivered with 2 inch to 4 inch leaf stems still on the beet. These stems break off and are in sufficient quantities together with leaves and other trash to plug an ordinary trash drag although high pressure jets are used to keep the bars clean. Beet leaf stems and other trash accumulated in the sludge collector at the Carlton plant to the extent that it was necessary to remove this floating mass with a crane. When this mass decomposed complaints were received from residents in the neighborhood. This year we are planning to use a vibrating screen as a secondary screen recovering this trash as a stock feed. The bars in the trash drag assembly will be changed to provide a half inch spacing, thereby making them more clog free, and the trash getting thru these openings will be screened out by the secondary screen. Proper equipment will be installed to load the trash from the secondary screen into trucks moving to the feed lots.

If it is impractical or impossible to clean up beets in the fields and the receiving equipment is inadequate to remove the mud, trash and dirt from the beets, the job has to be accomplished at the factories if we expect to maintain rated slicing capacity.