

Further, it is practicable to arrange the driving gear at either the loading or delivery end, but where possible it is an advantage to place it at the delivery end especially in long conveyors.

The tension gear may be either of an adjustable screw design or an ordinary weighted tension, and this, like the driving gear, may be placed almost anywhere taking into account, of course, local conditions and the general disposition of the plant. It is preferable in the case of long conveyors to use a weighted tension as there is a certain amount of lengthening and shortening of the fabric of the belt due to atmospheric conditions, and this alteration in the case of a long belt would necessitate constantly adjusting the tension gear if it was of the screw type, whereas with the simple weighted tension this arrangement automatically makes its own adjustment. The weighted tension gear has also another advantage and that is, it is impossible for the attendant to overstress the fabric which could be done with the other type.

The supporting rollers, idlers, as they are usually called, are made in various designs according to the fancy of the manufacturer or purchaser, but, generally speaking, they consist of a roller, or series of rollers, mounted on a spindle carried in bearings having grease lubrication. If a troughed top strand is required, each set of rollers is then generally made up of a series of small ones, some being set at the necessary angle to form the top strand into the trough shape. This type is much to be preferred to the conical roller all in one piece as the full width of the band is travelling at the same speed all across its surface. But on the roller either the outer edge of the cone is travelling faster or the smaller diameter is not running as fast as the band, and this sets up quite a considerable amount of friction liable to wear the band out very rapidly. The return strand is always carried on flat rollers similar in construction to the top rollers.

Some firms make a practice of putting in guide rollers. These are set at right angles to the edge of the belt and are intended to keep the band running true on the rollers. These are generally omitted on belts of short length and a common practice is to place a pair (one on each side of the belt) about every sixty feet. It is claimed that these are necessary owing to the belt having a tendency to run up the inclined rollers forming the trough in a similar manner that an ordinary driving belt keeps in the centre of a crowned face pulley.

Another method adopted to keep the belt in line is to set the top idle rollers at a very slight angle with a line drawn at right angles to the length of the band, that is, one would be set slightly out of line one way and the next the opposite way.

The conveying bands are manufactured in a number of different ways and consist of woven cotton, canvas or duck, either plain or impregnated with some kind of waterproofing material such as Salata, tar, or rubber coating. For most purposes, however, a rubber impregnated belt with an additional rubber covering will give the best results, as this method is more likely to produce a belt impervious to water. If the belt is being continually exposed to the action of rain it will soon rot away. Further, the rubber covering is a factor in preventing an undue lengthening and shortening of the belt due to the dryness or humidity of the atmosphere. Generally it may be said that the life of the rubber covering is somewhere about half the life of the belt as a whole even though the rubber may only be about one quarter of the thickness of the rest of the belt.

Another point that is also in favor of the rubber covering is the resistance this has to the abrasive action of the material carried, and its effect is to act as a cushion for the material to fall upon.

The writer has known of a case where an ordinary cot-

ton belt used as a picking conveyor for coal at a colliery only lasted about seven or eight months, and the expense of renewing it so often made the maintenance cost very high, but rubber faced belts used for similar purposes will last you two, three and perhaps four years if they are properly handled.

There seems to be quite a difference of opinion as to the desirability of making the belt of even plies right across its width, or of reducing the plies in the centre of the belt and thickening the rubber facing.

The general practice in this country seems, however, to lean towards the even ply belt, whereas in England the reverse is the case.

The writer's opinion inclines towards the uneven ply belt with an additional thickening of rubber in the centre where all the abrasive action takes place, because as soon as this protective covering is destroyed the final destruction of the belt is soon brought about. It is a good plan to overhaul the belt periodically and repair any bad cuts with a good stiff rubber solution; also where any sand or grit slobbs have been made under the surface they should be taken out and the cut repaired in a similar manner.

If this is done it will be found that the life of the belt will be much longer and will repay the expense incurred. The rubber coating varies from about one-sixteenth to a quarter of an inch, and the plies of the canvas or duck vary from about three to seven or eight according to the kind of material to be conveyed, the width and the length of the belt.

If material of a sticky or wet nature is being conveyed it is a wise plan to arrange a brush under the delivery shoot to clean the face of the belt, otherwise rapid wear is liable to take place owing to the gritty matter being carried round on the underside and thereby come into contact with the snub or gripping rollers and the bottom guide rollers. Further, this grit is likely to get into the bearings of the rollers and cause trouble with these also.

Another good point in an installation of this kind is to avoid all sharp reverse bends of the belt as far as possible, although sometimes this is not altogether practicable. The framing for these conveyors is generally of a very simple character simply consisting of cross supports for the rollers carried on longitudinal stringers of iron or steel. The latter are usually made to suit the general layout of the rest of the structure.

When starting to design a plant it is necessary to know the kind, quantity, general size of the material required to be handled, the magnitude of the largest pieces; whether the material is of a sticky or wet nature. The general layout of the surrounding structures. The points at which the material will be loaded on the band and also where it is required to be delivered, and the relative elevations of these two points, if they are not at the same height. Also whether it is proposed to drive by electric motor, steam engine, or from an existing shaft, and if the latter is the case, the size, speed and direction of rotation should be given and the position of same should be shown on a small sketch in relation to the rest of the other particulars required as to the location of the belt and the surrounding plant. With this information it will be possible for the designing engineer to submit a scheme suitable for the purpose required.

Having now got a general idea of the uses of belt conveyor installation with some of its general features, it is proposed to discuss a few of the smaller parts and then give some data on the capacities, horse-power required to drive same, etc.