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# Technical Calculation Screw Parameters of the Screw Construction of Working between Cotton Rows

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**ABSTRACT:** This article outlines the results of the theoretical research on the basis of the parameters of the working organs of technical calculation screw parameters of the screw construction of longitudinal pawl-creating device between cotton rows.

**KEYWORDS:** screw, screw-creating, pawl, coil conveyor, rising of soil corner, rotation number of coil conveyor

## I.INTRODUCTION

Nowadays the most part of cotton growing appropriates to irrigate farming. Nevertheless cotton growing in irrigating agriculture demands more labor forces, it is considered preferable for high yields productivity. Because of crops' area relf and uneven fields related with the cotton irrigating process will be implemented better by means of dividing pawls on the small fields. In this process along and across cotton pawls should be implemented before irrigating and use it till the end of crops period. Taking into consideration and making it quantities with all agricultural means is considered the actual problematic issue. Nowadays this process is being carried out by means of manual work at certain farmers. Manually made capsize creating surface pawls is also being used. This device does not give an opportunity to use widely because of creating across pawl between cotton raw doing aggregate in twice, the height of hurting cotton young growth. As solution of such kind of problems the scientists are doing research work according to create. This by technical means to form two longitudinal aggregating get done among a number of cotton past the threshold, at the same time to injure the cause of the high level of the germination of cotton-wide, there is no allow you to apply. The solution of this problem by scientists as among a number of active cotton Bukhara branch of the Tashkent Institute of Engineers for Mechanization and Agriculture to form a longitudinal threshold screw work conducts scientific research in the creation of the device. Recommended his new device has many advantages, particularly the lack of negative effects on cotton and energy economical and other advantages of the threshold implementation as a form i.e. in transition [1].

In some parts the Republic of Uzbekistan, for example, in the Republic of Karakalpakstan, Bukhara, Khorezm, Kashkadarya, and Navai regions, depending on the relief of the cultivated areas and the rough foams will contribute to irrigate the cotton plants by means of longitudinal and transverse pawls. This will help to decrease water consumption in the uneven fields and increase cotton fertileness by full watering. In this process, the longitudinal and transverse pawls are formed before primary irrigation and the fact that the longitudinal is preserved for using till the end of the sowing period, it is considered to be high quality and should considered all agro technical requirements.

It is important to determine the minimum operating temperature of the appliance, the diameter of the slab, the number of strokes and angles, and the horizontal angle of the horizontally adjusted soil, when the soil is raised with a certain amount of soil moisture.

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## II. DETERMINING THE DIAMETER AND THE STEP OF THE COIL CONVEYOR

The work of a clay working device through the cotton rows is similar to that of the coil conveyed carrier, which is ledged at a certain angle. It is a core element in the coil conveyed worker unit.

It is widely used in the transportation of materials with friable or viscous materials and is used to transport the soil to a horizontal angle at the formation of a longitudinal thrust between the pallets of cotton rows, one of which is highly effective.

The diameter and step of coil conveyor are determined according to the standard, taking into account working conditions. Tables 1 and 2 show the standard values of the diameter ($D_{ш}$) and the step (t) corresponding to the angle ($\alpha$) of relative to the horizon [2. 29th p].

**Table 1**

**The standard diameter and step of the coil conveyor setting angle α=0 regarding to horizon**

| *Diameter of coil conveyor* $\boldsymbol{D_{ш}}$, mm | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| *Step of coil conveyor t, mm* | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 |

**Table 2**

**The standard diameter and step of the coil conveyors when the mounted angle relatively α>0 regarding to horizon**

| *Diameter of coil conveyor* $\boldsymbol{D_{ш}}$, mm | 100 | 125 | 160 | 200 | 250 | 320 | 400 | 500 |
|---|---|---|---|---|---|---|---|---|
| *Step of coil conveyor* ***t****, mm* | 80 | 100 | 125 | 160 | 200 | 250 | 320 | 400 |

## III. DETERMINING THE DIAMETER OF THE COIL CONVEYOR

Here we first identify the external and internal diameter of the coil conveyor pipe. The external diameter of the coil conveyor pipe is determined by the fact that there are certain protective zones that will ensure that plants are not damaged by the cotton rows. Accordingly, the external diameter of the coil conveyor pipe is determined by the following inequality

$$D_{кт} \le A - 2a \quad , \tag{1}$$

in which: $D_{кт}$- external diameter of the coil conveyor pipe, in m;
$A$ - Width of line spacing, in m;
$a$ - width of the protective zone, in m.
Knowing the external diameter of the pipe, we determine the internal diameter of the pipe according to the following expression.

$$D_{ки} \le A - 2a - 2\delta \quad , \tag{2}$$

Where $\delta$– is the thickness of the wall of coil conveyor pipe ($\delta$ = 3 mm).
The diameter of the coil conveyor (2) is calculated as follows

$$D_{ш} \le A - 2(a + \delta + \lambda) \quad , \tag{3}$$

Where $\lambda$ - the radial interval between the coil conveyor and the pipe ($\lambda$ = 8-12 mm).

The external and internal diameter of the coil conveyor pipe between the width 600 mm and the width of the cotton wave (1) to (2), taking into account the aforesaid values $\delta$ and λ, according to the observed observations α = 80 mm, and (3) diameter should be no larger than 418, 434 and 440 mm. Based on the data given in Table 2 and State Standard 20295-85 [5], the diameter of the coil conveyor is 400 mm, step 320 mm, the internal diameter of the coil conveyor pipe is 420 mm and the external diameter is 426 mm.

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## IV. DETERMINING THE NUMBER OF ROTATION CYCLES

This parameter is determined by the fact that the actual sample of the device's coil conveyor workflow of work is minimal or equal to that required because otherwise the soil will be heaped behind the coil conveyor. Taking into consideration the fact that the device is equipped with two coil conveyors, the condition is written as:

$$Q_{uux} \geq 0.5Q_{\min}, \quad (4)$$

Where, $Q_{uux}$- is a real workflow of one unit of device.

The actual work efficiency of the coil conveyor carrier driven under certain angles to horizon can be determined by the following expression [3. 12th p].

$$Q = 3600\, S_{uu}\vartheta_m \rho C_\alpha, \quad (5)$$

In which $S_{ш}$–the surface of the transverse section of the material transported on the coil conveyor pipe, in $m^{2,}$

$\vartheta_m$ - material transporting speed, m/s,

ρ- The density of the transported material, kg/m3,

$C_\alpha$- is a coefficient that takes into account the effect of the workflow on the horizons in terms of their working angle.

The value of $C_\alpha$is based on Table 3.3 which is given below [2, 32nd p].

**Table 3**

**The installed position of the angle $\alpha^o$ relatively to the horizon is given by the values of the coefficient**

| $\alpha^o$ | 0 | 5 | 10 | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $C_\alpha$ | 1,0 | 0,9 | 0,8 | 0,7 | 0,65 | 0,58 | 0,52 | 0,48 | 0,44 | 0,4 | 0,34 | 0,3 |

The face of the transverse section of the material transported on the coil conveyor pipe and speed of transportation are determined by the following expression

$$S_{uu} = \frac{\pi D_{uu}^2}{4}\psi, \quad (6)$$

$$\upsilon_m = \frac{tn_{uu}}{60}, \quad (7)$$

Where, ψ- is the coil conveyor's filling coefficient,

$n_{uu}$- Number of coil conveyor's rotations, rounds/min

The value of ψ is 0.25 for small fractional material (soil, sand, sandy gravel, etc.) with a density of 800-1600 kg / m3 [3. 13th p]. It is suggested that the tractor speed of the tractor is in the direction of saturation of the coil conveyor carrier and the grounding hinge on the front of the coil conveyor carrier can be used to obtain this coefficient at ψ- 0,5-0,6 [2. 31st p].

Considering the expressions (7) and (6), expressions (6) have the following view:

$$Q_{uux} \geq 15\pi D_{uu}^2 \psi t n_{uu} \rho C_\alpha. \quad (8)$$

We denote this expression and the value of expression (8) of $Q_{\min}$ (4).

$$15\pi D_{uu}^2 \psi t n_{uu} \rho C_\alpha \geq 0.5 \cdot 1000 S_{yм}\vartheta_{mp}\rho. \quad (9)$$

We resolve this with regard to $n_{uu}$ and we get the following expression

$$n_{uu} \geq \frac{100 S_{yм}\vartheta_{mp}}{3\pi D_{uu}^2 \psi t C_\alpha}. \quad (10)$$

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In this statement, putting the values of the $S_{ум}$, $D_ш$, t defined above and $\psi$, $C_\alpha$, $\vartheta_{тр}$ are set at the above values, we determine that the number of rotations of the coil conveyor should be at least 301 round/min.

Regarding to a coil conveyed horizon, we define the angle of installation as follows

$$\alpha \prec \varphi , \tag{11}$$

Where, φ is the angle of friction on the coil conveyor pipe.

When the term (11) is done, the soil particles at the top of the coil conveyor pipe do not affect the soil particles beneath it. As a result, the technological process is carried out with low energy consumption and no deterioration is observed.

## V. CONCLUSION

According to the given information in the literature, φ should be lower than 30-35°. Thus, the angle of installation of the vortex to the horizon should not exceed 30° [4].

Thus, according to the research, it is desirable to use the only incoming intact coil conveyor on the pawl-creating device between cotton rows, to avoid damaging the seedlings, to maintain the required level of performance, and the low consumption of energy to the technological process, with the coil conveyor, its internal and external diameters have to be corresponding to 400 mm, 420 mm and 426 mm, the step of the coil conveyor 320 mm, the number of rotations 301 round/min and above and the angle of installation till 30º horizontally.

The number of rotation cycles required for the coil conveyor generator, which is the working body of pawl-creating device, is based on the required power consumption for the unit and the number of transmissions in the device is adjusted by a chain extension.

The results of the above theoretical research enable to define the parameters of the coil conveyed device used for the longitudinal pawls between the cotton rows.

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