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Kultivator Ish Organlarining Ishlash Chuqurligi Bo‘Yicha Barqaror Harakatini Tadqiq Etish

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Anatatsiya: Paxtachilik kultivatorining ish organlari belgilangan chuqurlikka botishi va shu chuqurlikda barqaror yurishi uchun ish organlariga tasir qilayotgan kuchlar taxlili o‘rganilgan.

Kalit so’z: Rama, ish organi, sharnirli bog’langan, tik reaksiya kuchlari, tayanch qurilmalar, radial va paralellogramm osish mexanizmlari.

Kultivator ish organlarining ishlash chuqurligi bo‘yicha barqaror harakatini paxtachilik kultivatori ish organlarining seksiyasi (keyingi o‘rinlarda ish organlari seksiyasi) misolida ko‘rib chiqamiz. Buning uchun birinchi navbatda 1.1-rasmda keltirilgan sxemadan foydalanib ish organlari seksiyasiga ta’sir etayotgan kuchlarning S sharnir(nuqta)ga nisbatan momentlari tenglamasini tuzamiz. U quyidagi ko‘rinishga ega bo‘ladi.

$$M_C = m_c g(l_3 + l_n \cos\varphi_n) \pm R_z(l_2 + l_n \cos\varphi_n) +$$

$$+ Q_n(l_4 + l_n \cos\varphi_n) + 0{,}5(m_{ю} + m_n) g l_n \cos\varphi_n + P_{ю} k \cos\varphi_n -$$

$$- R_x(l_1 + l_n \sin\varphi_n) - N_x(l_5 + l_n \sin\varphi_n) - N_z(l_n \cos\varphi_n - l_6)\,, \quad (1.1)$$

bunda Q_n – prujinaning bosim kuchi, N;

g – erkin tushish tezlanishi, м/с^2;

m_c, $m_{ю}$, m_n – mos ravishda ish organlari seksiyasi hamda parallelogramm

mexanizm yuqorigi va pastki bo‘ylama tortqilarining massasi, kg;

R_x, R_z – tuproq tomonidan ish organlariga ta’sir etayotgan qarshilik

kuchlari teng ta’sir etuvchisining gorizontal va tik tashkil etuvchilari,N;

N_x, N_z – tuproq tomonidan ish organlari seksiyasining tayanch g‘ildiragiga

ta’sir etayotgan reaksiya kuchining gorizontal va tik tashkil etuvchilari, N;

P_{yu} – parallelogramm mexanizm yuqorigi tortqisi tomonidan ish organlari seksiyasiga ta’sir etayotgan kuch, N;

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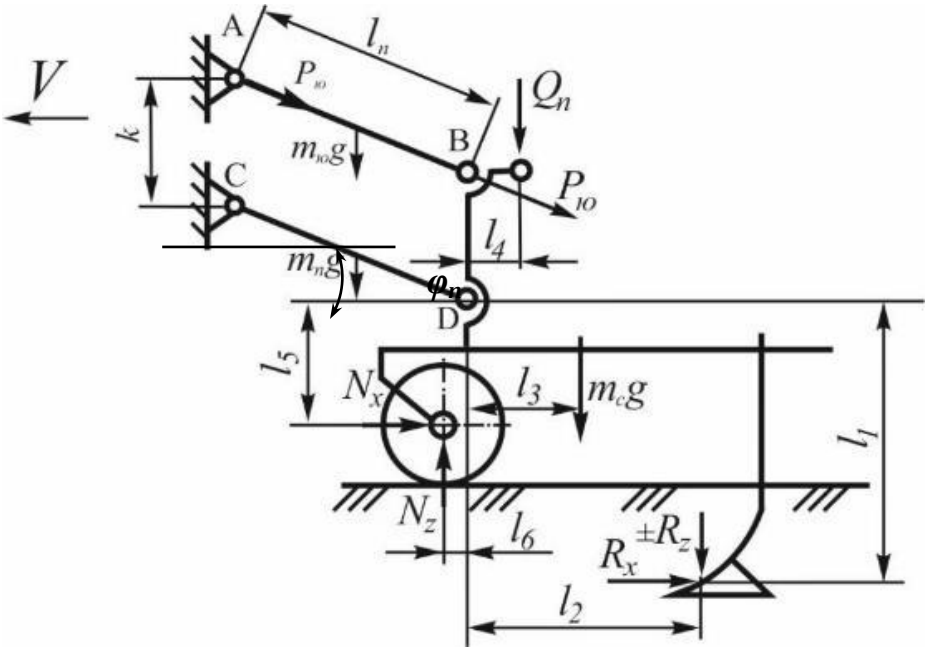

1.1-rasm. Kultivator ish organlari seksiyasiga ta’sir etuvchi kuchlarning sxemasi

l_n – parallelogramm mexanizm tortqilarining uzunligi, m;

k – parallelogramm mexanizm A va S qo‘zg‘almas sharnirlari orasidagi tik masofa, m;

$l_1,\ldots,l_6$ – mos ravishda R_x, R_z, $m_c g$, Q_n, N_x va N_z kuchlarning parallelogramm mexanizmning qo‘zg‘aluvchan sharniri D ga nisbatan yelkasi, m;

φ_n – parallelogramm mexanizm bo‘ylama tortqilarining gorizontga nisbatan o‘rnatilish burchagi, gradus.

$m_{yu}+m_p << m_c$ ekanligini hisobga olib, (1.1) ifodani quyidagi ko‘rinishda yozib olamiz

$$M_C = m_c g(l_3 + l_n \cos\varphi_n) \pm R_z(l_2 + l_n \cos\varphi_n) +$$

$$+ Q_n(l_4 + l_n \cos\varphi_n) + P_{ю} k \cos\varphi_n - R_x(l_1 + l_n \sin\varphi_n) -$$

$$- N_x(l_5 + l_n \sin\varphi_n) - N_z(l_n \cos\varphi_n - l_6). \quad (1.2)$$

1.1-rasmda keltirilgan sxemaga binoan

$$P_{ю} = \left[R_x l_1 + N_x l_5 - N_z l_6 \mp R_z l_2 - m_c g l_3 - Q_n l_4\right]/(k\cos\varphi_n). \quad (1.3)$$

P_{yu} ning bu qiymatini (1.2) ifodaga qo‘yib, qo‘yidagi natijaga ega bo‘lamiz

$$M_C = (mg + Q_n \pm R_z - N_z) l_n \cos\varphi_n - (R_x + N_x) l_n \sin\varphi_n. \quad (1.4)$$

Ish organlari seksiyasiga ta’sir etayotgan kuchlarning parallelogramm mexanizmning qo‘zg‘almas A sharniriga nisbatan momentlari tenglamasini tuzib ham xuddi shunday natijaga ega bo‘lamiz, ya’ni

$$M_A = (mg + Q_n \pm R_z - N_z) l_n \cos\varphi_n - (R_x + N_x) l_n \sin\varphi_n. \quad (1.5)$$

(1.4) va (1.5) ifodalar tahlili shuni ko‘rsatadiki, paxtachilik kultivatori ish organlarining ishlov berish chuqurligi bo‘yicha barqaror harakatini tadqiq etishda ularga ta’sir etayotgan barcha kuchlarni parallelogramm mexanizmning D yoki V qo‘zg‘aluvchan sharniriga qo‘yilgan deb qarash va hisobiy sxema sifatida 2.2-rasmda tasvirlangan matematik mayatnik sxemasini qabul qilish mumkin.

1.1-rasmda keltirilgan sxemaga binoan paxtachilik kultivatorining ish organlari belgilangan

chuqurlikka botishi va shu chuqurlikda barqaror yurishi uchun quyidagi shart bajarilishi lozim

$$(mg + Q_n \pm R_z) l_n \cos\varphi_n > R_x l_n \sin\varphi_n \quad (1.6)$$

yoki

$$mg + Q_n \pm R_z > R_x tg\varphi_n . \quad (1.7)$$

Bu shartlar bajarilganda ish jarayonida parallelogramm mexanizm-ning tayanch g‘ildiragi (keyingi o‘rinlarda tayanch g‘ildirak) doimiy ravishda tuproq yuzasiga bosib turiladi va natijada ish organlari belgilangan chuqurlikka botib va ishlov berish chuqurligini o‘zgartirmasdan ishlaydi.

Xulosa:

Tadqiqotlarimizni ko‘rsatishicha paxtachilik kultivatorlarining ish organlari belgilangan chuqurlikka botishi va shu chuqurlikda barqaror harakatlanishi uchun ular parallelogramm mexanizmlarining bo‘ylama tortqilari ish jarayonida gorizontal yoki unga yaqin holatni egallab ishlashi lozim.

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