



TIQXMMI  
AGRICULTURE AND WATER RESOURCES

ЎЗБЕКИСТОН RESPUBLIKASI OLIY TA'LIM, FAN VA  
ИННОВАЦИЯЛАР ВАЗИРЛИГИ

«ТОШКЕНТ ИРРИГАЦИЯ ВА ҚИШЛОҚ ХЎЖАЛИГИНИ  
МЕХАНИЗАЦИЯЛАШ МУҲАНДИСЛАРИ ИНСТИТУТИ»  
МИЛЛИЙ ТАДҚИҚОТ УНИВЕРСИТЕТИ



O'ZBEKISTON RESPUBLIKASI OLIY TA'LIM, FAN VA INNOVATSIYALAR VAZIRLIGI

"TOSHKENT IRRIGATSIYA VA QISHLOQ XO'JALIGINI MEKANIZATSIYALASH MUHANDISLARI INSTITUTI"  
MILLIY TADQIQOT UNIVERSITETI

"QISHLOQ VA SUV XO'JALIGINING ZAMONAVIY MUAMMOLARI"

XXII - yosh olimlar, magistrantlar va iqtidorli talabalarning  
ilmiy - amaliy anjumani

TOSHKENT 2023 12-13 MAY

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“ҚИШЛОҚ ВА СУВ  
ХЎЖАЛИГИНИНГ ЗАМОНАВИЙ  
МУАММОЛАРИ”

мавзусидаги анъанавий *XXII* - ёш  
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- амалий анжумани

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*XXII - traditional Republic  
scientific - practical conference of  
young scientists, master students  
and talented students under the topic*

“THE MODERN PROBLEMS OF  
AGRICULTURE AND WATER  
RESOURCES”

МАҚОЛАЛАР ТЎПЛАМИ

I ТОМ

Тошкент – 2023 йил, 12-13 май





Dastlabki ma'lumotlar quyidagilarni o'z ichiga oladi:

2. EurOpal 7 N 90 rusumli plugning qamrov kengligi;  $B_{pl} = (3+1) \cdot 30 = 1,2m$  ;  
 $B_{pl} = (3+1) \cdot 35 = 1,4m$  ;  $B_{pl} = (3+1) \cdot 40 = 1,6m$  ;  $B_{pl} = (3+1) \cdot 45 = 1,8m$
3. Plug tarkibidagi korpuslar soni yoki qamrov kengligini o'zgartirish imkoniyatlari:  
 $b=30$  sm;  $b=35$  sm;  $b=40$  sm;  $b=45$  sm.
4. EurOpal 7 N 90 rusumli plugning foydalanish og'irligi  $G_{pl} = 9,408$  ;
5. Tuproqning solishtirma qarshiligi  $K = 70$  kN/m<sup>2</sup>;
6. Shudgorlashda agrotexnik ruxsat etilgan tezliklarining oraliq qiymatlari:  
 $v_{min} = 8$  km/s va  $v_{max} = 12$  km/s .

Tanlanadigan traktorning foydalanish sharoitlari quyidagilar bilan belgilanadi:

1. Yuqori quvvatli g'ildirakli traktordan foydalanish nazarda tutiladi;
2. Traktor transmissiyasining foydali ish koeffisienti  $\eta_t = 0,91$ ;
3. Traktor g'ildiraklarning ruxsat etilgan shataksirashi,  $\delta = 15$  , %;
4. Traktor g'ildiraklarining agrofondagi tuproq bilan ilashish koeffisienti  $\mu = 0,8$ ;
5. Traktor yurish qismining dumalanishiga qarshilik koeffitsienti  $f = 0,08$ ;
6. Traktor ishlaydigan dala maydonining qiyaligi,  $i = 3$ .

Masalani yechish. EurOpal 7 N 90 rusumli plugning bitta korpusi kengligini (0,30; 0,35; 0,40; 0,45 sm) belgilab olamiz. Bitta korpus kengligidan kelib chiqib tanlangan plugning umumiy qamrov  $B_{pl}$  kengligini aniqlab olamiz.

Plugning tortishga (sudarshga) qarshiligini quyidagi formula bo'yicha hisoblaymiz

$$R_{ag} = B_{pl} \cdot K_{pl} \cdot a \pm G_{pl} \frac{i}{100}$$

$$R_{ag} = B_{pl} \cdot K_{pl} \cdot a \pm G_{pl} \frac{i}{100} = 1,2 \cdot 70 \cdot 0,28 + 9,408 \cdot 0,03 = 23,8 ; \text{kN};$$

$$R_{ag} = B_{pl} \cdot K_{pl} \cdot a \pm G_{pl} \frac{i}{100} = 1,4 \cdot 70 \cdot 0,28 + 9,408 \cdot 0,03 = 27,72 ; \text{kN}$$

$$R_{ag} = B_{pl} \cdot K_{pl} \cdot a \pm G_{pl} \frac{i}{100} = 1,6 \cdot 70 \cdot 0,28 + 9,408 \cdot 0,03 = 31,64 ; \text{kN}$$

$$R_{ag} = B_{pl} \cdot K_{pl} \cdot a \pm G_{pl} \frac{i}{100} = 1,8 \cdot 70 \cdot 0,28 + 9,408 \cdot 0,03 = 35,56 ; \text{kN}$$

Mazkur plug bilan ishlash uchun agrotexnik jihatdan ruxsat etilgan tezliklarining oraliq qiymatlarida talab etiladigan tortish quvvatni quyidagi formulalar yordamida aniqlaymiz:

$$N_{ag} = \frac{R_{ag} (v_{min} \dots v_{max})}{3,6} , \text{yani}$$

Avval 8 km/soat tezlik uchun barcha variantlarni aniqlab chiqamiz

$$N_{ag} = \frac{R_{ag} \cdot v_{min}}{3,6} = \frac{23,8 \cdot 8}{3,6} = 52,8 , \text{kW}$$





$$N_s^{\min} = \frac{N_{ag}^{\min}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{70,3}{0,91 \left(1 - 0,15 - \frac{0,08 + 0,03}{1 \cdot 0,8}\right)} = \frac{70,3}{0,648} = 108,48 \text{ kW}$$

$$N_s^{\min} = \frac{N_{ag}^{\min}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{79,02}{0,91 \left(1 - 0,15 - \frac{0,08 + 0,03}{1 \cdot 0,8}\right)} = \frac{79,02}{0,648} = 121,94 \text{ kW}$$

Endi 12 km/soat tezlik uchun barcha variantlarni ham aniqlab chiqamiz

$$N_s^{\max} = \frac{N_{ag}^{\max}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)}$$

$$N_s^{\max} = \frac{N_{ag}^{\max}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{79,3}{0,648} = 122,37 \text{ kW}$$

$$N_s^{\max} = \frac{N_{ag}^{\max}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{92,4}{0,648} = 142,59 \text{ kW}$$

$$N_s^{\max} = \frac{N_{ag}^{\max}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{105,46}{0,648} = 162,74 \text{ kW}$$

$$N_s^{\max} = \frac{N_{ag}^{\max}}{\eta_t \left(1 - \frac{\delta}{100} - \frac{f \pm \frac{i}{100}}{\lambda \cdot \mu}\right)} = \frac{118,53}{0,648} = 182,91 \text{ kW}$$

Quyidagi amalga oshirilgan hisoblardan  $N_s^{\min}$  va  $N_s^{\max}$  traktor dvigateli quvvatining oraliq qiymatlarini yozib olamiz

$$N_s^{\min} = (81,48 \dots 121,91) \text{ kW}$$

$$N_s^{\max} = (122,37 \dots 182,91) \text{ kW}$$

$$N_s^{\min} \dots N_s^{\max} = (81,48 \dots 182,91) \text{ kW}$$

Keyingi bosqichda ko'riladyotgan sharoit (agrofon) uchun yer (tuproq) bilan yetarlicha ilashish hossasini ta'minlaydigan traktorning foydalanish  $G_f$  og'irligi aniqlanadi.

$$G_f^{\min} = \frac{3,6 \cdot N_s^{\min} \cdot \eta_t}{v_{\max} \cdot \lambda \cdot \mu}$$

$$G_f^{\min} = \frac{3,6 \cdot N_s^{\min} \cdot \eta_t}{v_{\max} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 81,48 \cdot 0,91}{12 \cdot 1 \cdot 0,8} = 27,8 ; \text{ kN}$$

$$G_f^{\min} = \frac{3,6 \cdot N_s^{\min} \cdot \eta_t}{v_{\max} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 95,06 \cdot 0,91}{12 \cdot 1 \cdot 0,8} = 32,43 ; \text{ kN}$$

$$G_f^{\min} = \frac{3,6 \cdot N_s^{\min} \cdot \eta_t}{v_{\max} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 108,48 \cdot 0,91}{12 \cdot 1 \cdot 0,8} = 37,01 ; \text{ kN}$$

$$G_f^{\min} = \frac{3,6 \cdot N_s^{\min} \cdot \eta_t}{v_{\max} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 121,94 \cdot 0,91}{12 \cdot 1 \cdot 0,8} = 41,61 ; \text{ kN}$$

$$G_f^{\max} = \frac{3,6 \cdot N_s^{\max} \cdot \eta_t}{v_{\min} \cdot \lambda \cdot \mu}$$

$$G_f^{\max} = \frac{3,6 \cdot N_s^{\max} \cdot \eta_t}{v_{\min} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 122,37 \cdot 0,91}{8 \cdot 1 \cdot 0,8} = 62,6 ; \text{ kN}$$

$$G_f^{\max} = \frac{3,6 \cdot N_s^{\max} \cdot \eta_t}{v_{\min} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 142,59 \cdot 0,91}{8 \cdot 1 \cdot 0,8} = 72,98 ; \text{ kN}$$

$$G_f^{\max} = \frac{3,6 \cdot N_s^{\max} \cdot \eta_t}{v_{\min} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 162,74 \cdot 0,91}{8 \cdot 1 \cdot 0,8} = 83,3 ; \text{ kN}$$

$$G_f^{\max} = \frac{3,6 \cdot N_s^{\max} \cdot \eta_t}{v_{\min} \cdot \lambda \cdot \mu} = \frac{3,6 \cdot 182,91 \cdot 0,91}{8 \cdot 1 \cdot 0,8} = 93,62 ; \text{ kN}$$

Quyidagi amalga oshirilgan hisoblardan  $G_f^{\min}$  va  $G_f^{\max}$  traktorning foydalanish og'irligining oraliq qiymatlarini yozib olamiz

$$G_f^{\min} = (27,8 \dots 40,44) ; \text{ kN}$$

$$G_f^{\max} = (62,6 \dots 93,62) ; \text{ kN}$$

$$G_f^{\min} \dots G_f^{\max} = (27,8 \dots 93,62) ; \text{ kN}$$

bu yerda ikkita qiymatni hisoblash yetarli bo'ladi, ya'ni:

1.  $G_f^{\min}$  ni  $v_{\max}$  va  $N_s^{\min}$  :

27,8 kN ; 12 km/s ; 81,48;

32,43 kN ; 12 km/s ; 95,06;

37,01 kN ; 12 km/s ; 108,48;

40,44 kN ; 12 km/s ; 121,94;







$$\eta_{s,f} = \frac{N_{ag}}{N_d^{max}} = \frac{91,63}{101,79} = 0,9$$

Traktor dvigateli quvvatidan foydalanish koeffitsienti quyidagicha aniqlanadi

$$\eta_{s,f} = \frac{N_{ag}}{N_s^n} = \frac{91,63}{157} = 0,58$$

Traktorning maksimal mumkin bo‘lgan tortishish quvvatidan foydalanishi koeffitsienti (samaradorligi) quyidagicha aniqlanadi

$$\eta_i^{max} = \frac{N_d^{max}}{N_s^n} = \frac{101,79}{157} = 0,64$$

Traktor dvigatelining samarali foydalaniladigan quvvati quyidagicha aniqlanadi

$$N_s = \frac{v_{max}}{3,6} \left\{ R_{ag} \left[ 2 - \eta_i \left( 1 - \frac{\delta}{100} \right) \right] + G_s \left( f \pm \frac{i}{100} \right) \right\} = \\ = \frac{11,9}{3,6} \{ 27,72 [ 2 - 0,91 \cdot 0,85 ] + 79,72 \cdot 0,11 \} = 140,5 \quad ; \text{ kW}$$

Traktor dvigatelining yuklanish koeffitsienti quyidagicha aniqlanadi

$$\eta_{yuk,yuk}^{tr} = \frac{N_s}{N_s^n} = \frac{140,5}{157} = 0,89$$

Agregatning bir soat toza ish vaqtidagi hisobiy ish unumi quyidagicha aniqlanadi

$$W = 0,1 \cdot B_{max} \cdot v_{max} = 0,1 \cdot 1,4 \cdot 11,9 = 1,66 \quad \text{ga/soat}$$

Har gektar maydonga sarf bo‘ladigan hisobiy yonilg‘i sarfi quyidagicha aniqlanadi

$$q_{hu}^{yoz} = \frac{10^{-3} \cdot g \cdot N_s^n}{W} = \frac{10^{-3} \cdot 210 \cdot 157}{1,66} = 19,86 \quad \text{kg/ga}$$

#### Hulosalar.

7. Amalga oshirilgan nazariy tadqiqot va hisob natijalari shuni ko‘rsatadiki, EuroOpal 7 rasumli plug uchun tanlab olingan NeW Holland N-7060 rasumli traktordan tuzilgan xaydov ageragti bilan har bir korpusining qamrov kengligi 35 sm va 11,9 km/soat ish tezligi bilan ishlaganda berilgan sharoit uchun energiyatejamkorlik talabini qondiradi, maqbul (oqilona) mashina traktor agregat tuzilgan hisoblanadi.

8. Shu bilan birga yana maqbul qarorni topish uchun agregatlashning boshqa variantlarini ham tahlil qilish tavsiya etiladi.

9. Masalan, talablarga javob beradigan traktorning boshqa rusumini tanlab olib shu plug korpusining boshqa qamrov kengligida agregatni tuzish va tahlil qilib ko‘rish ham tavsiya etiladi. Agar, boshqa variantda tuzilgan xaydov agregati qachon maqbul tuzilgan hisoblanadi, qachonki bir birlik bajarilgan ish uchuni uning ish unumining eng yuqori, yonilg‘i sarfining eng kam bo‘lishini ta’minlay olsa.



