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CHERVIYAKLI UZATMANI QIZISHINI BARTARAF ETISH YO‘LLARI

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Annotatsiya

Ushbu ma’qolada cherviyakli reduktorni ishlatish jarayonida sovitishning sun’iy usulidan foydalanish samarasi haqida fikirlarni bayon etilgan.

Kalit so‘zlar: Chervyak, chervyak g’ildiragi, tabiiy sovitish, sun’iy sovitish, vintiliator. Silindirik chervyak, globaik chervyak, moylash, chervyakli reduktor, tempiratura rejimi.

Аннотация:

В данной статье представлены идеи о влиянии применения искусственного способа охлаждения в процессе использования червячного редуктора.

Ключевые слова: Червяк, червячное колесо, естественное охлаждение, искусственное охлаждение, вентилятор. Цилиндрический червяк, шаровой червяк, смазка, червячный редуктор.

Abstract

In this article, ideas about the effect of using an artificial method of cooling in the process of using a worm gear reducer are presented.

Key words: Worm, worm wheel, natural cooling, artificial cooling, ventilator. Cylindrical worm, globe worm, lubrication, worm reducer,

Cherviyakli uzatma bu kinematik juft bo‘lib, chervyak va chervyak g‘ildiragidan tuzilgan o‘qlari esa o‘zaro ayqash holatda joylashgan. Ayqash burchagining qiymati har-xil bo‘lishi mumkin, broq amalda u asosan 90^0 bo‘ladi. Chervyakli uzatmaning ishlash prinsipini vintli juftning ishlash prinsipi kabi bo‘lib ancha avzalliklarga ega va mashinasozlik sanoatida va xalq xojaligida ko‘p ishlatiladi. Asosiy kamchiliklaridan biri to‘xtovsiz ishlaganda qizib ketishi va buning natijasida g‘ildirak uchun rangli materialning ishlatilishi hisoblanadi.

Cherviyakning tez aylanishi hamda sirpanish hodisasining mavjudligi uzatmada ko‘p miqdorda issiqlik hosil bo‘lishiga olib keladi. Uzatmaning haddan tashqari qizib ketmasligini taminlash uchun zarur choralar ko‘rish lozim. Buning uchun hosil bo‘ladigan issiqlik miqdori bilan mavjud sharoidda olib ketilishi mumkin bo’lgan issiqlik miqdori aniqlanib, bir-biriga taqqoslanadi va lozim bo’ladigan hollarda olib ketiladigan issiqlik miqdorini oshirish choralari belgilanadi.

Chervyakli uzatmada ish jarayonida mexanik energiyaning bir qismi issiqlik energiyasiga aylanib uzatmani qizitadi. Agar uzatma yetarli darajada sovitilmasa u qizib tezda ishdan chiqishi mumkin. Uzatmaning qizib ketmasligini taminlash uchun sovitishning sun’iy usulidan foydalaniladi.

Sovitishni quyidagi usullardan foydalaniladi:

- Tabiiy holda sovitish

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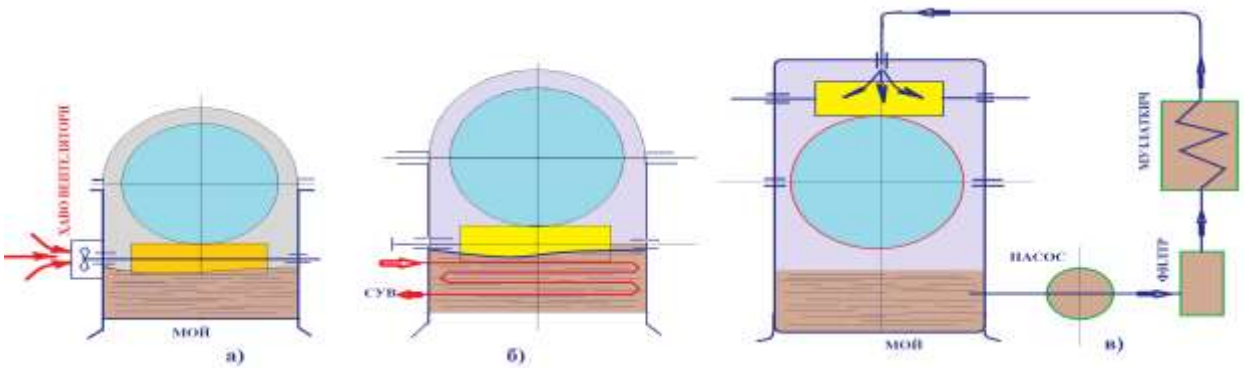
- Sun’iy holda sovitish

Sovitishning sun’iy usuliga cherviyak valiga ventiliator o’rnatish



(1-a chizma)

Reduktor ichida to’xtovsiz sovuq suv oqib turadigan, bir necha bor bukulgan quvurni moy ichiga joylashtirish

(1- b chizma)

Moyni maxsus sovitib haydash usuli kiradi

(1- v chizma)

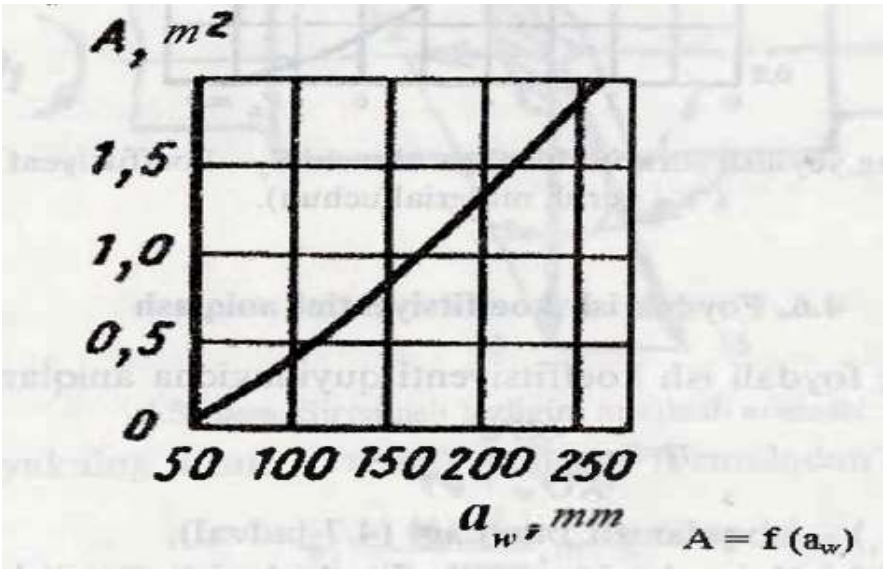
Tabiiy sovitish usuli samarali bo’lmagan hollarda sun’iy sovitish usulidan foydalanib, reduktorni doimiy narmal ishchi holatda ushlab turishi mumkin. Ayniqsa sovitishning cherviyak valiga ventiliator o’rnatish usulu ancha samara beradi.

Chervyakning tez aylanishi ham sirpanish tezligining kattaligi uzatmada ko‘p miqdorda issiqlik hosil bo‘lishiga olib keladi. Uzatmaning haddan tashqari qizib ketmasligini ta’minlash uchun zarur tadbirlar ko‘rish lozim.

1.1. Reduktor korpusining umumiy sovitish yuzasi A (m_2) qiymati 1-rasmdan yoki quyidagi ifodadan aniqlanadi:

$$A \approx 12{,}0 \cdot a_w^{13} \qquad (1)$$

Bunda: a_w – o‘qlararo masofa, mm.



1-rasm. Reduktor sovitish yuzasining qiymati.

1.2. Agar reduktorning bir qismi ventilatorsir sovitilsa, u holda $A_a = 0{,}3 \cdot A$ ga teng bo‘ladi.

1.3. Agar reduktor metal ramaga yoki plitaga o‘rnatilgan bo‘lsa, u holda quyidagi talabga javob berishi kerak:

a) Reduktor ventilatorsiz o‘zi sovushiga sarflanadigan harorat quyidagi formuladan aniqlanadi:

$$t_{ish} = \frac{10^3(1-\eta)P_l}{K_T A(1+\psi)} + t^0 \leq [t]_{ish,} \qquad (2)$$

Bunda: K_t=9…17- issiqlik chiqarish koeffitsiyenti $W/(m^2 \cdot ℃)$ (katta qiymati yaxshi sovitiladigan sharoit uchun);

t_{ish} - reduktor tanasidagi hororat (turg‘un ishlagan sharoitda);

$t^0 = 20℃$ - atrofidagi havo harorat.

$\psi \approx 0{,}25 \ldots 03$ – metal plitaga yoki ramaga reduktor tanasidan ajralib chiqadigan issiqlik miqdorini hisobga oluvchi koeffitsiyent. Agar reduktor beton yoki g‘ishtli poydevorga o‘rnatilgan bo‘lsa $\psi \approx 0$ -deb qabul qilinadi.

$[t]_{ish} = 95^0$ – moyning maksimal ruxsat etilgan harorati;

P_1 – chervyak validagi quvvat, kW.

b) REduktor maxsus ventilator bilan sovutilsa, u holda harorat quyidagi formuladan aniqlanadi:

$$t_{ish} = \frac{10^3(1-\eta)P_1}{[K_T(o{,}7+\psi)+0{,}3K_{TB}]A} + t^0 \leq [t]_{ish,} \qquad (3)$$

bunda: K_{TK} – ventilator bilan sovutilganda issiqlik ajralish koeffitsiyenti.

N_2, ayl/min	750	1000	1500	3000
$K_{TB}, w/m^2$ ℃	17	21	29	40

Yuqorida ko‘rilgan choralarda ham reduktor yaxshi sovutilmasa, u holda suv bilan sovutish yoki reduktorning o‘lchamlarini kattalashtirish zarur.

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