

O'zbekiston Respublikasi
Oliy va o'rta maxsus ta'lim vazirligi

Toshkent avtomobil-yo'llar instituti

**“Materillar qarshiligi” fanidan materillarning mexanik
xususiyatlarini o'rganish, po'latning elastiklik modulini
aniqlash bo'yicha laboratoriya mashg'ulotlari**

Toshkent, 2011

“Materiallar qarshiligi” fanidan institut bakalavr bosqichi talabalari uchun laboratoriya mashg’ulotlari o’tkazishga mo’ljallangan uslubiy ko’rsatmada, fan bo’yicha namunaviy va ishchi dasturlarda qayd etilgan laboratoriya mashg’ulotlarining qisqacha bayoni, nazariy asoslari va sinov natijalarining tahlili aks ettirilgan va diagrammalar keltirilgan.

Tuzuvchi:

“Amaliy mexanika” kafedrası katta o’qituvchisi R.A.Haytaliyeva

LABARATORIYA ISHI № 1

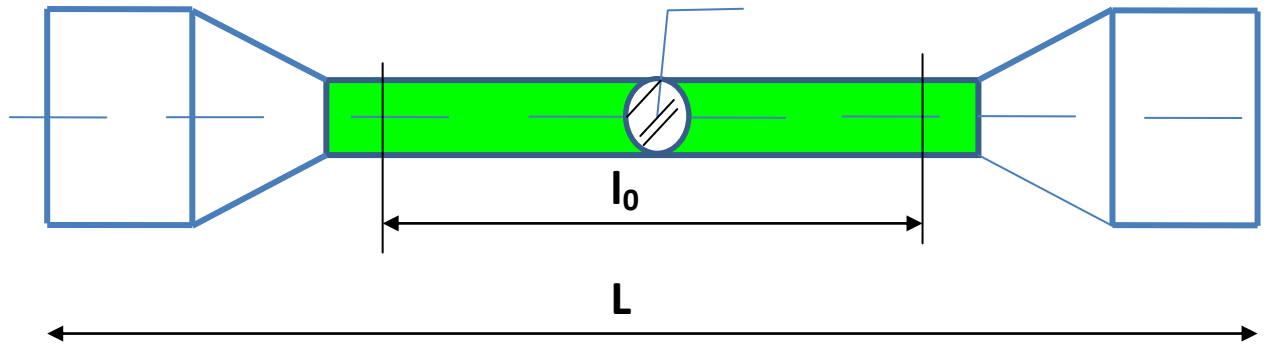
Kam uglerodli po'latning cho'zilishga sinash.

Ishning maqsadi.

1. Namunani cho'zuvchi kuch va shu kuch ta'siridagi uzayish orasidagi bog'lanish.
2. Cho'zilishda po'lat namunaning mexanik xossalarini aniqlash.
3. Plastiklik xarakteristikasi.

Tajribani UMM-10 moshinasida bajariladi.

Namunaning sinovgacha shakli va o'lchamlari.

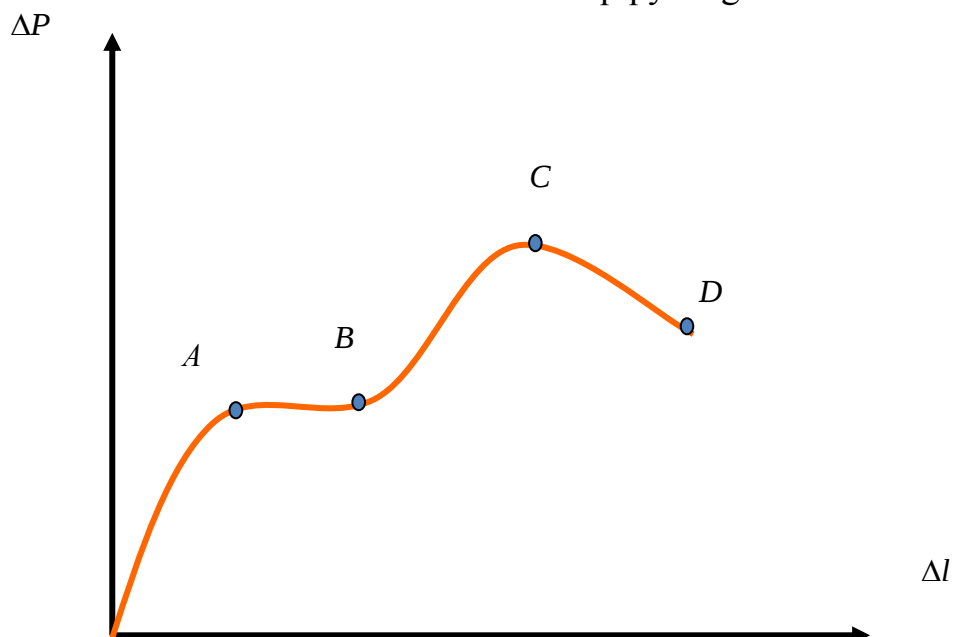


$l_0 = 100mm$ – namunani hisobiy uzunligi;

$d_0 = 10mm$ -namunaning boshlang'ich diametri;

$$F = \frac{\pi d_0^2}{4} = 78.5mm^2$$

Cho'zilishni haqiqiy diagrammasi



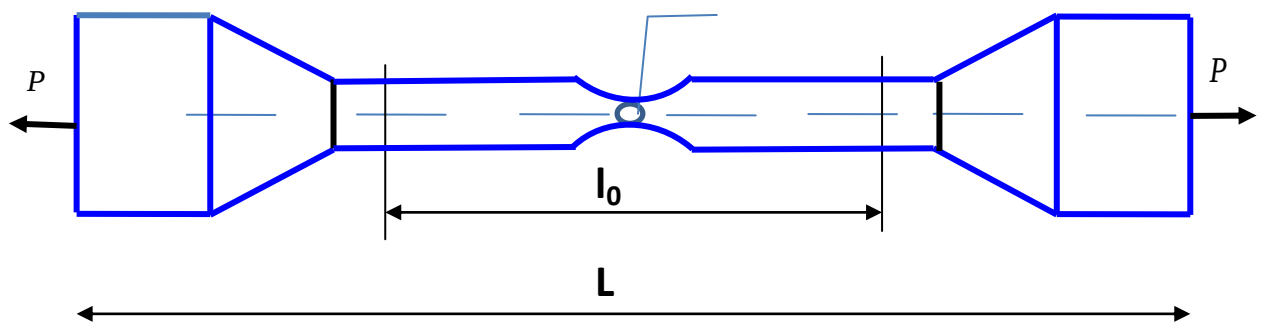
OA-Proporsionallik zonasi $P_A = 19kN$

AB-Oquvchanlik zonasi $P_B = 21kN$

BC-Mustahkamlik zonasi $P_C = 42kN$

CD-Mahalliy oqish zonasi $P_D = 32kN$

Namunaning sinovdan keyingi shakli va o'lchamlari.

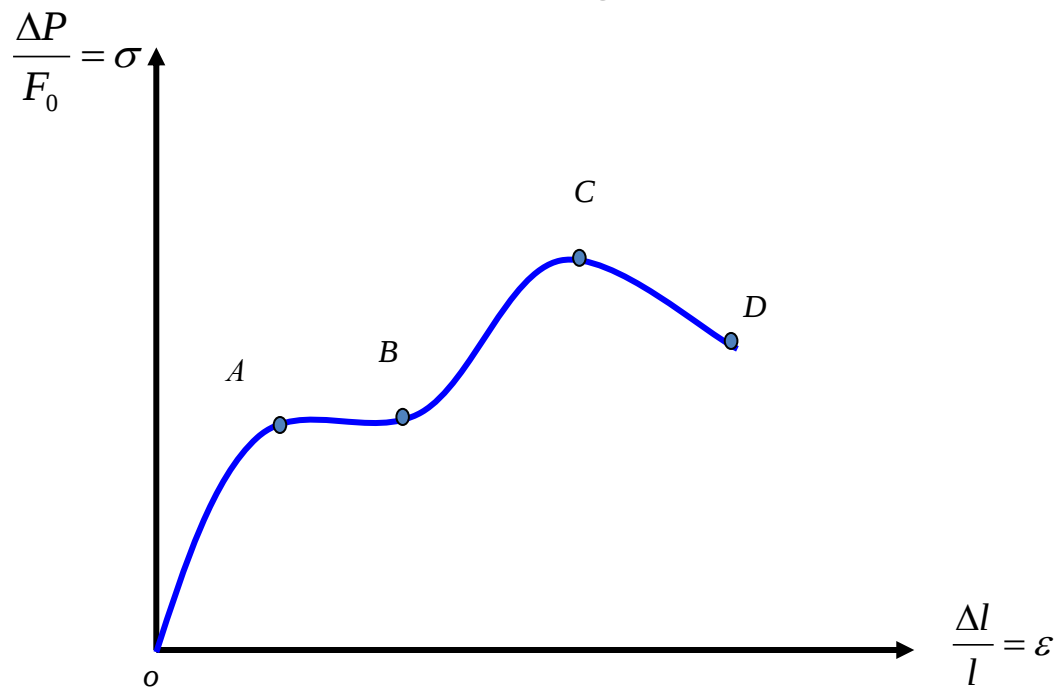


$$d_b = 8mm$$

$$l_k = 130mm$$

$$F_b = \frac{\pi d_0^2}{4} = 50.26mm^2$$

Shartli diagramma.



A-Proporsionallik chegarasi $\sigma_a = \frac{P_a}{F_0} = \frac{19kH}{78.5mm^2} = 242MPa$

B-Oquvchanlik chegarasi $\sigma_b = \frac{P_b}{F_0} = \frac{21kH}{78.5mm^2} = 267.5MPa$

C-Mustahkamlik chegarasi

$$\tau_c = \frac{P_c}{F_0} = \frac{42kH}{78.5mm^2} = 5.35MPa$$

D-Uzilish nuqtasi

$$\sigma_d = \frac{P_d}{F_0} = \frac{32kH}{50.26mm^2} = 636.689MPa$$

Nisbiy qoldiqli uzayish.

$$\delta = \frac{l_k - l_0}{l_0} 100\% = \frac{130 - 100}{100} 100\% = 30\%$$

Nisbiy qoldiqli torayish.

$$\psi = \frac{F_0 - F_b}{F_0} 100\% = \frac{78.5 - 50.24}{78.5} 100\% = 36\%$$

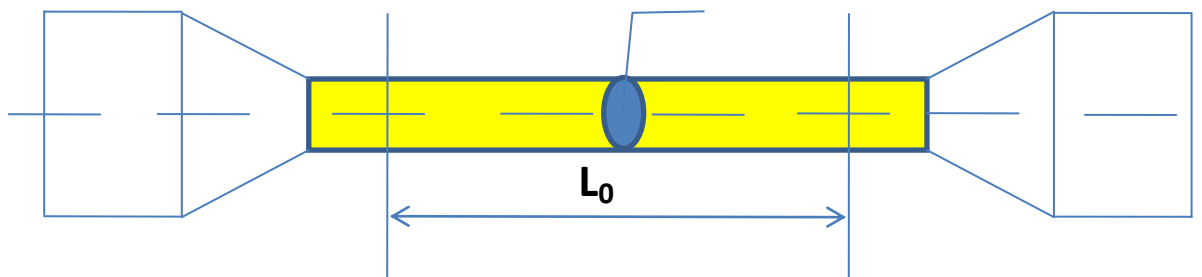
LABARATORIYA ISHI №2
Po'latning Elastiklik modulini aniqlash

Ishning maqsadi:

1) Guk qonunini tekshirish.

2) Cho'zilishda po'latning elastiklik modulini aniqlash.

Tajribani UMM-10 mashinasida bajaramiz:



$$L_0 = 100 \text{ m} \quad d_0 = 10 \text{ mm}$$

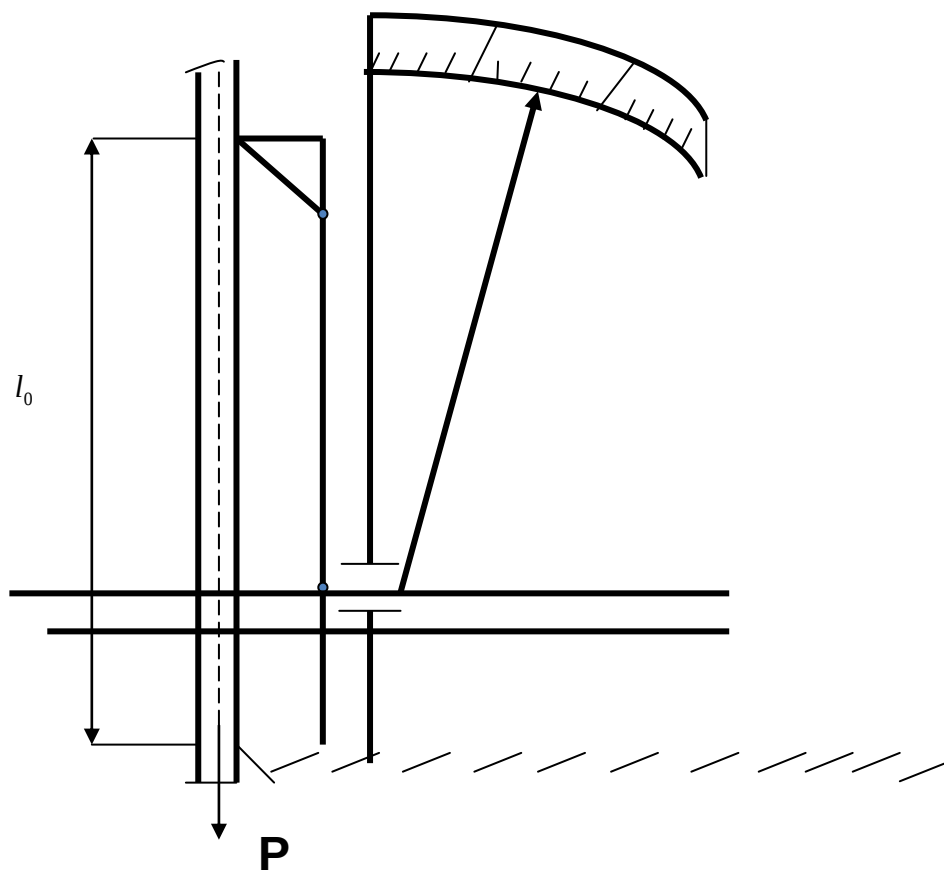
$$F_0 = \frac{\pi d_0^2}{4} = \frac{3.14 \cdot 10^2}{4} = 78.5 \text{ mm}^2$$

Kuch ta'siridan namunaning absalyut uzayishini MIL Tenzometrdan foydalanib aniqlaymiz.

Tenzometr sxemasi

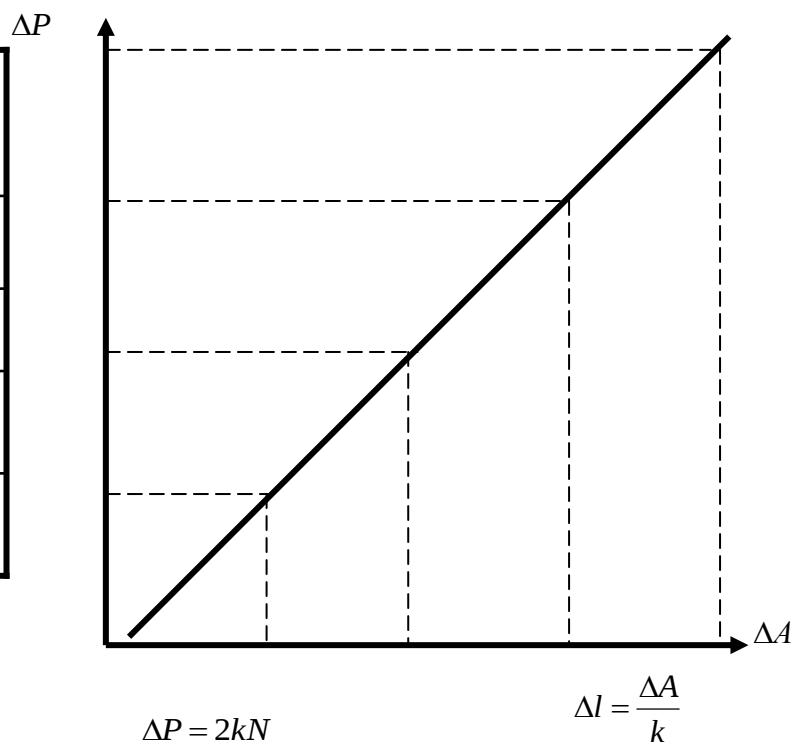
K-tenzometrni kattalashtirish koefsienti

K=500



Tajriba jadvali:

No	P kN	ΔP kN	A mm	ΔA mm
1	2	2	6.5	6.5
2	4	2	13	6.5
3	6	2	19.5	6.5
4	8	2	26	6.5



GUK qonuni: $\Delta l = \frac{\Delta P \cdot l_0}{EF_0}$

$$\Delta A = 6.5 \text{ mm}$$

$$\Delta E = \frac{\Delta P \cdot l_0}{\Delta F_0} = \frac{2 \cdot 10^3 \cdot 100 \cdot 500}{6.5 \cdot 78.5 \cdot 10^{-6}} \approx 1.95 \cdot 10^5 \text{ MPa}$$