TO‘SINLI FERMALARNI HISOBLASH

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ANNOTATSIYA

Ushbu maqola to‘sinli fermalar haqida, ularni hisoblash bo‘yicha aniq masalalarda yechimlari keltirilgan.

Kalit so‘zlar: *ferma, masala, yuklama, balandligi, ta’sir etadigan kuchlar, o‘lchamlar.*

АННОТАЦИЯ

В данной статье показаны способы расчета ферм. Здесь в конкретных примерах показаны расчеты ферм.

Ключевые *слова: ферма, пример, действующие силы, размеры, высота.*

KIRISH

Bugungi kunda qurilish industriyasida ko‘plab metall konstruksiyalaridan, jumladan, metalldan yasalgan fermalardan keng foydalanilmoqda. Shu bois ularni loyihalashda asosiy o‘rnini hisoblash islariga katta ahamiyat berilishi zarur. Ushbu maqolada metall fermai hisoblash masalasi ko‘rsatib o‘tiladi

Fermani loyixalash va xisoblash to‘g‘risida umumiy ma’lumotlar

Hozirgi davrda uchburchak shaklli, trapesiyasimon, parallel kamarli va ko‘pburchakli poligonal fermalar qo‘llaniladi. Uchburchak shaklli fermalar tom yopmasiga keskin qiyalik 250–450 talab etadigan materiallar bilan yopilishda qo‘llaniladi. (to‘lqinli asbest-sement shiferlar, cherepitsalar va b.)

Tayanch qismi murakkab ustun bilan faqat sharnir orqali biriktiriladi. Aksariyat hollarda fermaning o‘lchamlari undan foydalanishdagi, me’morchilik va texnologik talablarga ko‘ra belgilanadi. Trapetsiyasimon fermalar tomi keskin qiya bo‘lmagan binolarda ish-latiladi. Konstruktiv tomonidan bir necha afzalliklarga ega, eguvchi moment epyurasiga to‘laroq javob beradi, ustun bilan ham mustahkam, ham sharnir orqali biriktirilishi mumkin.

Parallel kamarli fermalar sanoat ishlab chiqarishi talablarini to‘laroq qondirishi va oddiy ko‘rinishga ega bo‘lgani sababli qurilishda ko‘proq qo‘llaniladi.

Ko‘pburchakli poligonal fermalarning tashqi ko‘rinishi egivchi moment epyurasining shakliga yaqin bo‘lganligi tufayli ular materialning sarflanishi nuqtai nazaridan eng tejamli deb hisoblanadi. Shuning uchun bunday fermalar, asosan katta oraliqli bo‘lgan binolarni qoplashda va yuklar nisbatan katta bo‘lganda qo‘llaniladi.

Elementlarda hosil bo‘ladigan hisobiy kuchlarni qurilish mexanikasi usullaridan foydalanib topiladi va elementlarning kesim yuzalari aniqlanadi:

Masala. To’sinli fermalarni hisoblash.

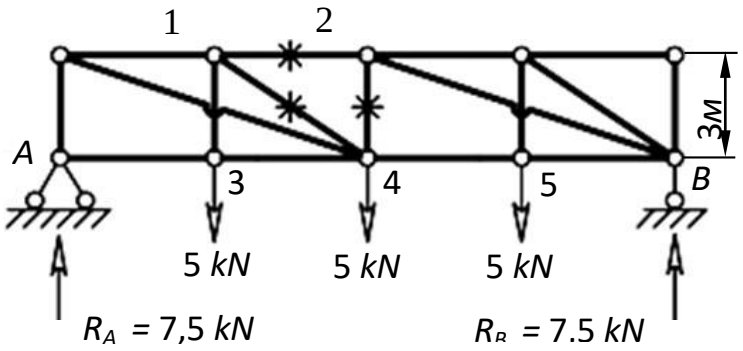
Xisoblash uchun berilganlar: hisob chizmasi (1- rasm);

Fermaning uzunligi L=12*m (ferma ustunlari orasidagi masofa* ℓ=3 *m);*

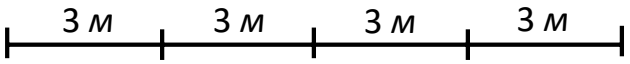
Fermaning balandligi h = 3 *m ;*

Fermaning ustunlariga $F_{13} = F_{24} = F_{65}$ = 5 *kN kuchlar qo’yilgan.*

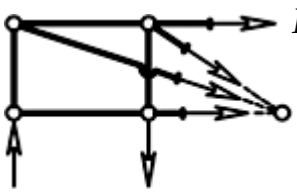
Yechish. *a*) Fermaning qo’zg’almas yuklamasi ta’sirida uning belgilangan tayoqchalariga tushadigan kuchni aniqlaymiz*:*



1- rasm



1- *qirqim*



4- *tugun*

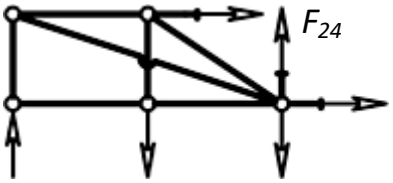
(moment oluvchi nuqta)

7,5 *kN* 5 *kN*

$\Sigma M_4 = 0\ F_{12}\cdot 5 + 7{,}5\cdot 6 - 3\cdot 3 = 0 \Rightarrow$

$F_{12} = -7{,}2$кН

2- *qirqim*

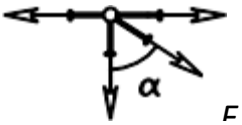


7,5 *kN* 5 *kN* 5 *kN*

$\Sigma Y = 0\ \ F_{24} + 7{,}5 - 5 - 5 = 0 \Rightarrow$

$F_{24} = 2{,}5$ кН

3- *qirqim*

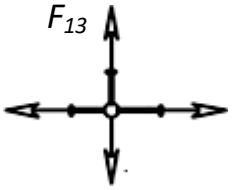


F13

$\Sigma Y = 0\ \ F_{14}\cdot\cos\alpha - F_{13} = 0 \Rightarrow$

$F14 = -F13/\cos\alpha$

4- *qirqim*

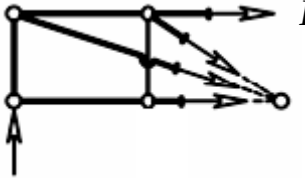


$\Sigma Y = 0\ F_{13} - 5 = 0 \Rightarrow F_{13} = 5$kN

$F_{14} = -F_{13}/\cos\alpha = -5/(3/5) = -8{,}3$kN.

b) Belgilangan tayoqchalarga tushadigan kuchning ta'sirini aniqlaymiz:

1- *qirqim*



4- tugun

(moment oluvchi nuqta)

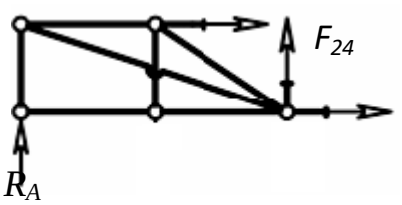
R_A

$\Sigma M_4 = 0$

$F_{12} \cdot 3 + R_A \cdot 8 = 0 \Rightarrow$

$R_A = -2{,}7\ kN$

2- *qirqim*

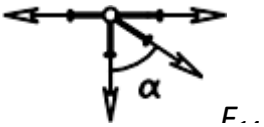


$\Sigma Y = 0\ F_{24} + R_A = 0 \Rightarrow$

$R_A = -F_{24}$

(o'ng tarmoq tenglamasi)

3 *qirqim*



F13

$\Sigma Y = 0$

$F_{13} + F_{14} \cdot \cos\alpha = 0 \Rightarrow$

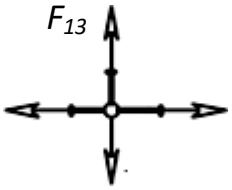
$F_{13} = -F_{14}\ 3/5$

$F_{13} = 4.98 \approx 5$

$F_{13} = 5$

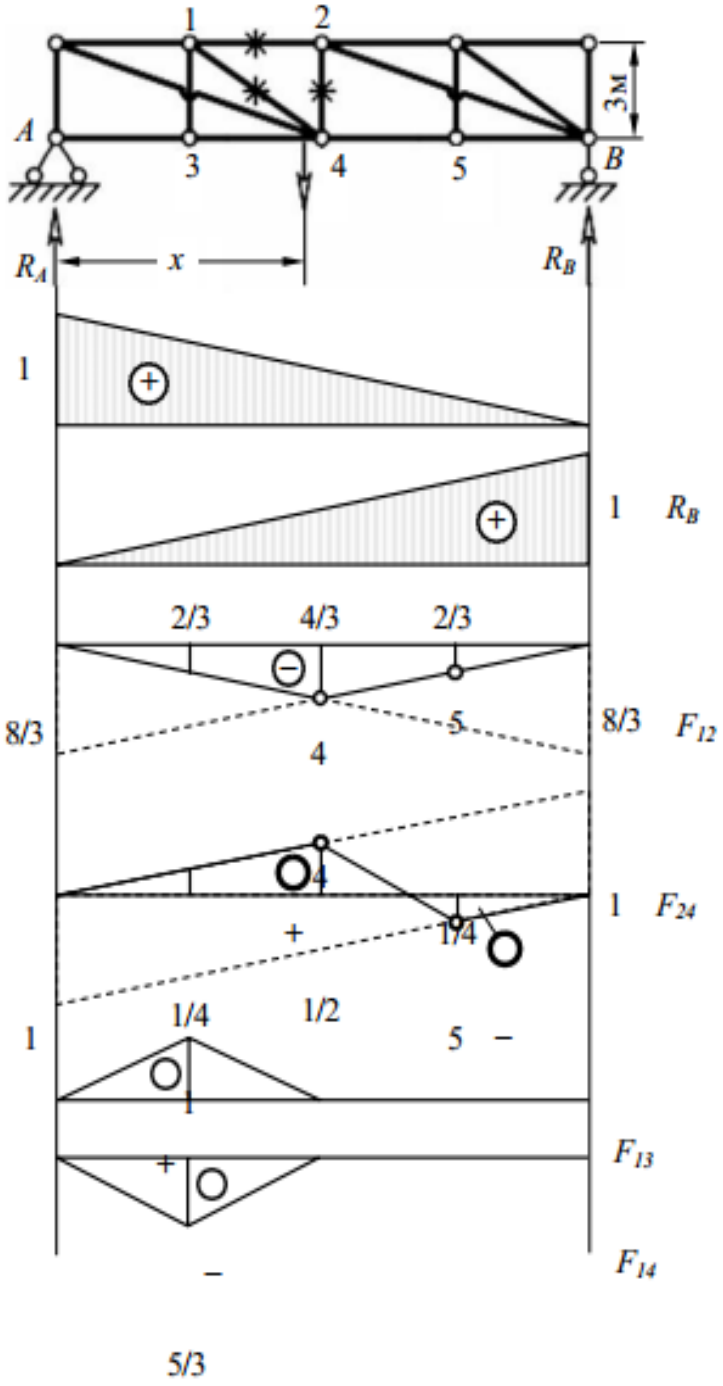
.

4- qirqim



$\Sigma Y = 0\ F_{13} + \boldsymbol{F_{14}} \cdot 3/5 = 0 \Rightarrow$

c) Aniqlangan kuch va momentlar bo'yicha ularning epyuralarini quring.



FOYDALANILGAN ADABIYOTLAR

1. N.A. Samig‘ov “Qurilish materiallari va buyumlari” darslik. Toshkent:. Cho‘lpon 2013-yil.
2. Arxitektura ashyoshunosligi kitobi. E.Qosimov.
3. Беленя Е.И. Металлические конструкции. Москва, Стройиздат, 1985г.
4. Мельников Н.П. Металлические конструкции. Москва, Стройиздат, 1983.