

FAN:

GIDROMETRIYA

MAVZU

09

Suv oqimi tezligini  
gidrometrik o'lchash asoslari



NAZARALIYEV DILSHOD  
VALIDJANOVICH



Gidrologiya va gidrogeologiya  
kafedrası dotsenti

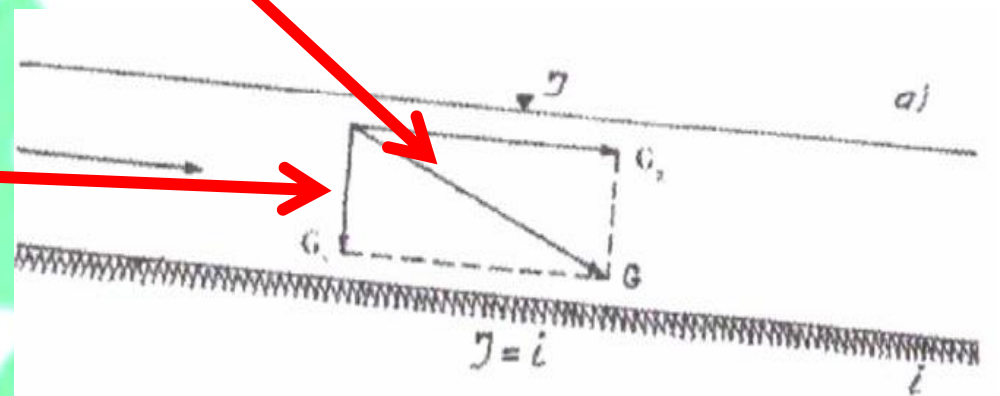
# Reja:

- ❑ Suv oqimi tezligini gidrometrik o'lchash asoslari. Suv harakati haqida umumiy ma'lumot.
- ❑ Turbulent va laminar oqimlar.
- ❑ Suvning oqish tezligini taqsimlanishi.
- ❑ Tezlik epyurasi. Izotaxa. Vertikallar bo'yicha tezlikni taqsimlashi.

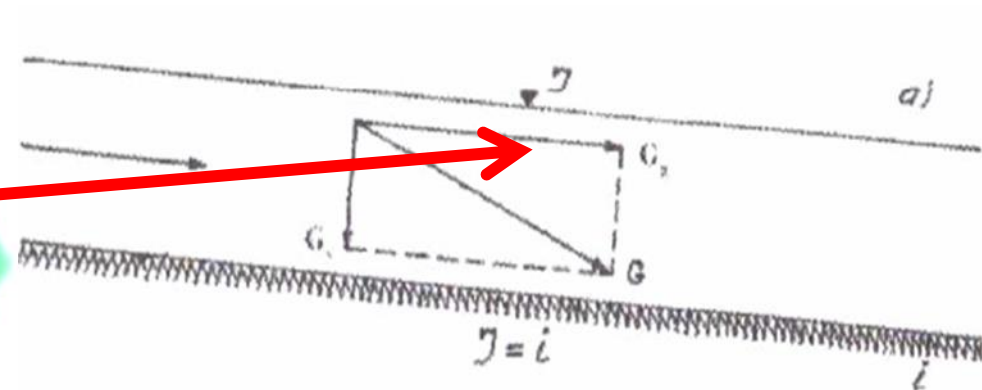
# Ochiq oʻzarlarda suvning harakati haqida umumiy maʼlumotlar

Maʼlumki, daryo oʻzanida suv ogirlik kuchi ( $G$ ) taʼsirida harakatga keladi. Bu kuchning tashkil etuvchilari quyidagilardan iborat:

- Oʻzan tubiga perpendikulyar yoʻnalishda taʼsir etadigan vertikal tashkil etuvchi kuch ( $G_v$ ). Bu kuch oʻzan tubidan boladigan aks taʼsir kuchi bilan muvozanatlashadi;



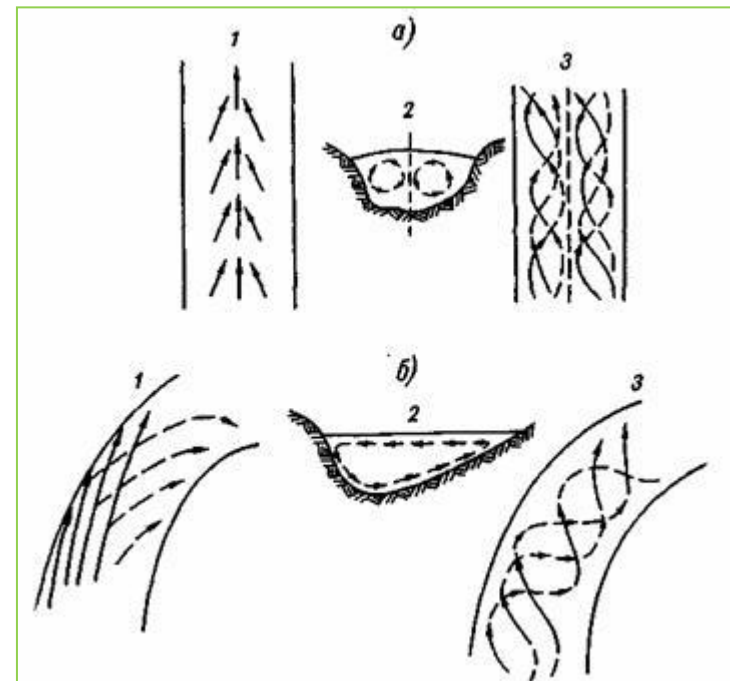
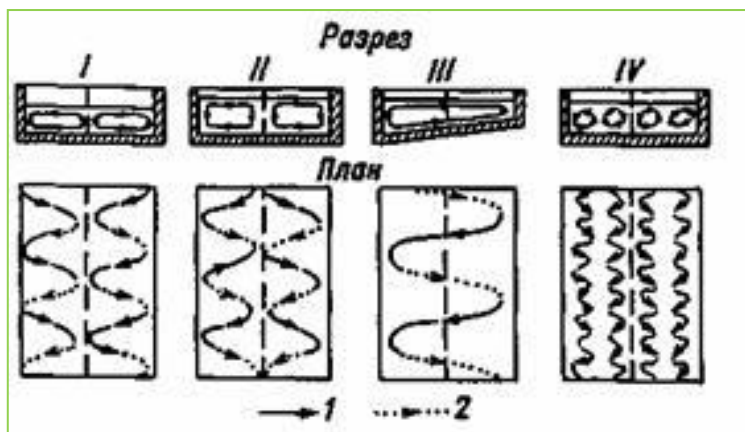
- O‘zan tubiga nisbatan parallel yo‘nalishda ta‘sir etadigan gorizontal tashkil etuvchi kuch ( $G_g$ ). Bu kuch o‘zan tubi nishabligiga bogliq bolib , o‘zanda suvning harakatini vujudga keltiradi.



# Gorizontaal tashkil etuvchi kuch

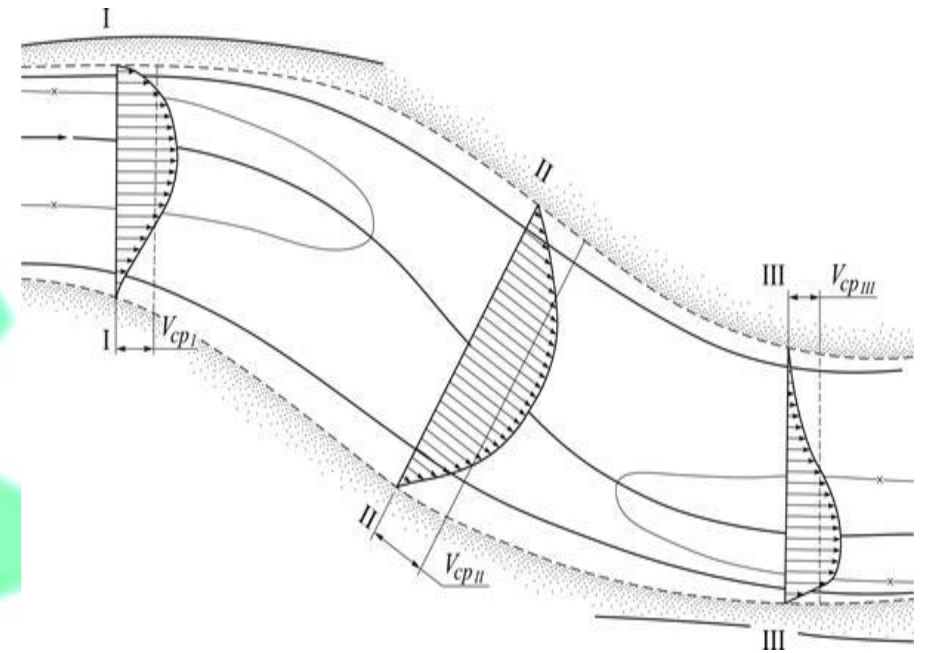
Gorizontaal tashkil etuvchi kuch doimiy ta'sir qilib turgani uchun daryoda suv tezlanish bilan harakat qilishi kerak edi.

Lekin, o'zan tubi va qirg'oqlar bilan suv massalari orasidagi ishqalanish tufayli unday bo'lmaydi.



# Daryo uzunligi bo'yicha suvning oqish tezligi

Daryo uzunligi bo'yicha o'zan tubi nishabligi, o'zan tubi g'adir-budurligining o'zgarishi, o'zanning torayishi yoki kengayishi kabi omillar harakatlantiruvchi va unga qarshilik ko'rsatuvchi kuchlar muvozanatini o'zgartirib turadi. Natijada daryo uzunligi bo'yicha suvning oqish tezligi turlicha bo'ladi.



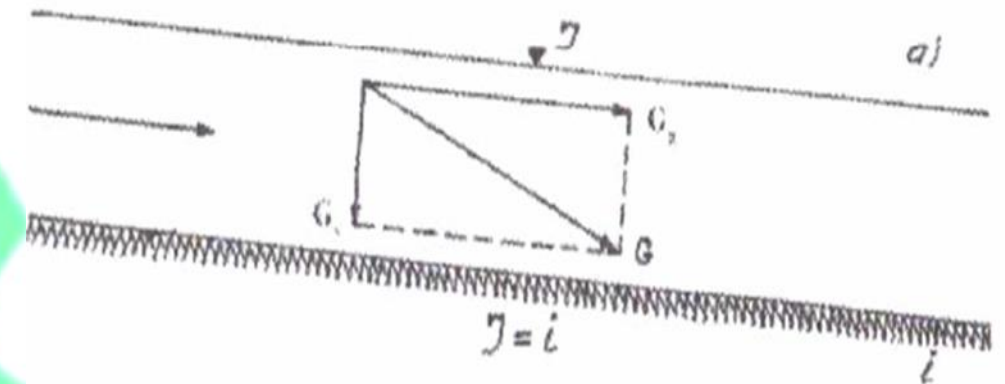
# Daryo o'zanida oqayotgan suvning harakati turlari

Daryo o'zanida oqayotgan suvning harakatini quyidagi ikki turga:

- ❑ o'zgarmas harakat;
- ❑ o'zgaruvchan harakatlarga ajratish mumkin.

# O'zgarmas harakat, o'z navbatida, ikkiga - tekis va notekis harakatlarga bo'linadi

Tekis harakatda suvning oqish tezligi ( $V$ ), jonli kesma maydoni ( $W$ ), suv sarfi ( $Q$ ) daryo uzunligi bo'yicha o'zgarmas, ya'ni bir xil qiymatlarda kuzatiladi.

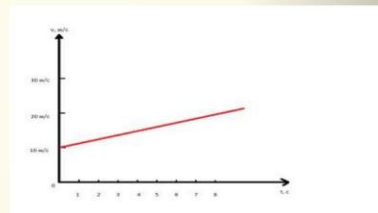
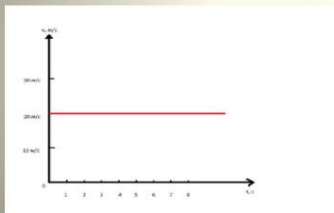


Natijada o'zan tubi nishabligi ( $i$ ) va suv sathi nishabligi ( $I$ ) bir-biriga teng yoki parallel bo'ladi.

## Графики (скорость)

Равномерное прямолинейное движение

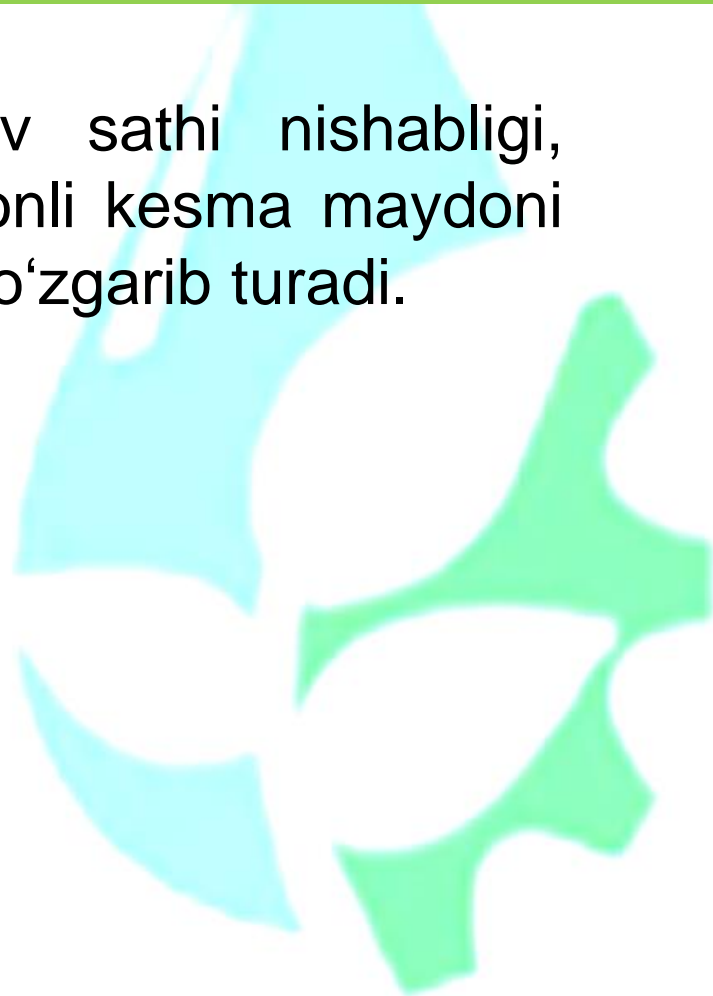
Неравномерное прямолинейное движение





# Notekis harakat

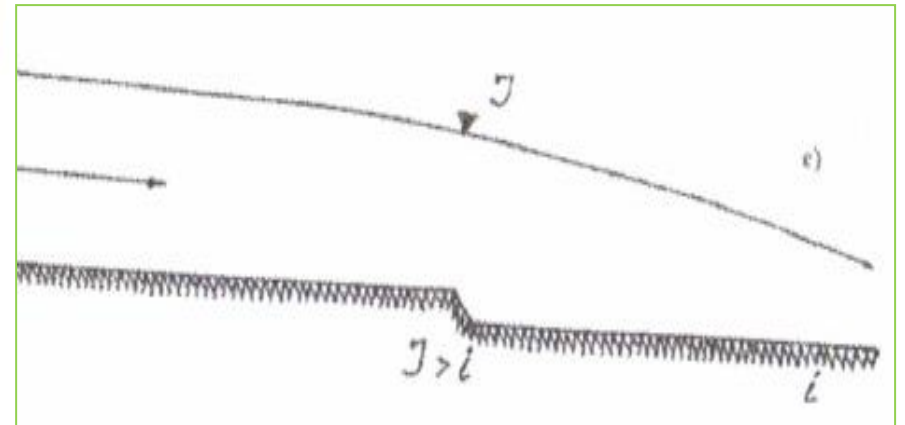
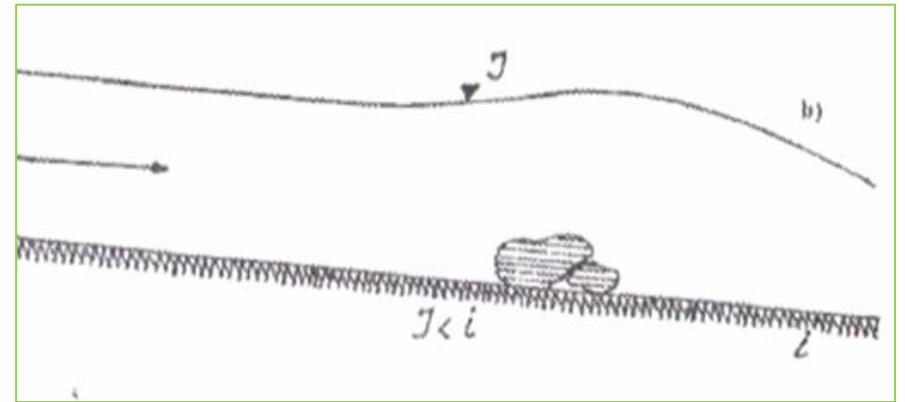
Notekis harakatda suv sathi nishabligi, suvning oqish tezligi, jonli kesma maydoni daryo uzunligi bo'yicha o'zgarib turadi.



# Notekis harakat sekinlanuvchan va tezlanuvchan harakatlarga bolinadi.

Sekinlanuvchan harakatda suv sathi nishabligi (I) o'zan tubi nishabligi ( i ) dan kichik bo'ladi.

Tezlanuvchan harakatda esa uning teskarisi kuzatiladi



# O'zgaruvchan harakatda oqimning barcha gidravlik elementlari:

- ❑ suvning oqish tezligi ( $V$ ),
- ❑ jonli kesma maydoni ( $w$ ),
- ❑ suv sarfi ( $Q$ ) va boshqalar daryo uzunligi hamda vaqt bo'yicha o'zgaruvchan bo'ladi.

Bunday harakat daryolarda to'linsuv davrida, gidrotexnik inshootlar, ayniqsa suv omborlari to'g'onlarining quyi byeflarida kuzatiladi.

# Suvning oqish tezligini o'lchashni ahamiyati

Suvning oqish  
tezligini o'lchash

ahamiyati



suv sarfini aniqlashda

# Suvning oqish tezligini o'lchashni ahamiyati

Suvning oqish  
tezligini o'lchash

ahamiyati



gidrotexnik inshootlarni loyihalash  
va qurishda



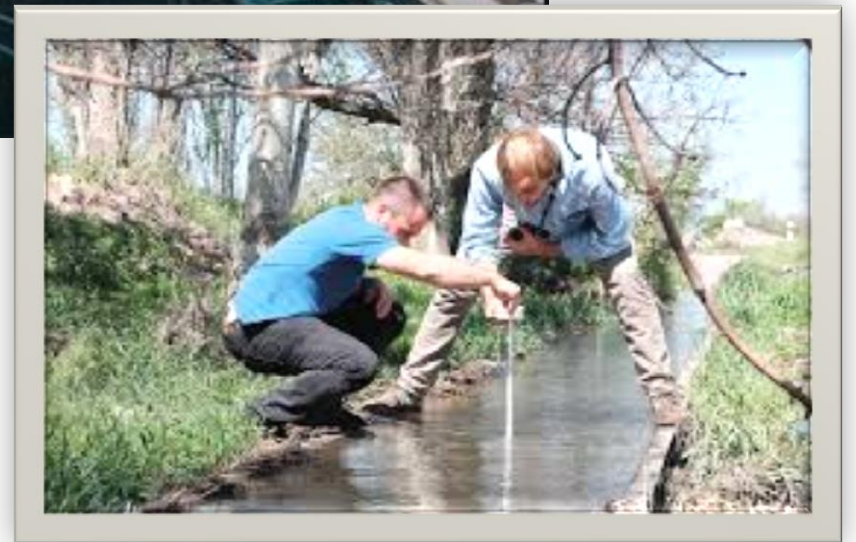
# Suvning oqish tezligini o'lchashni ahamiyati

Suvning oqish  
tezligini o'lchash

ahamiyati



ilmiy-amaliy  
masalalarni hal  
qilishda

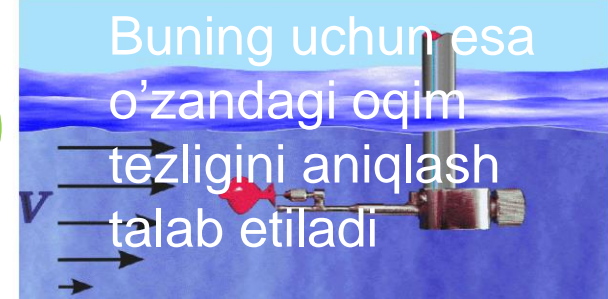


# Tezlikni o'lchashdan ko'zlangan maqsad

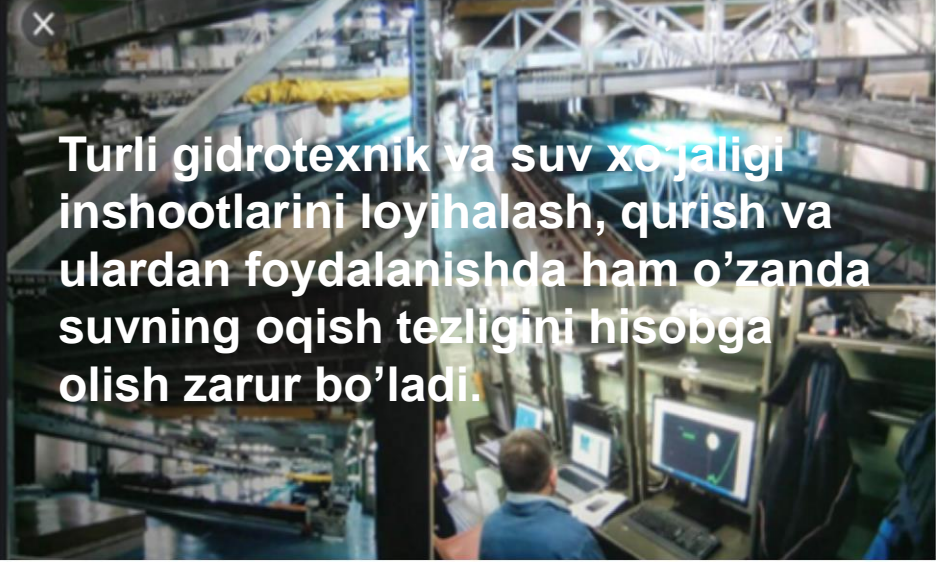
Suv rejimining asosiy elementi hisoblangan suv sarfini aniqlashdan

Xalq xo'jaligini rivojlantirish uchun suv sarfini aniq bilish

Buning uchun esa o'zandagi oqim tezligini aniqlash talab etiladi

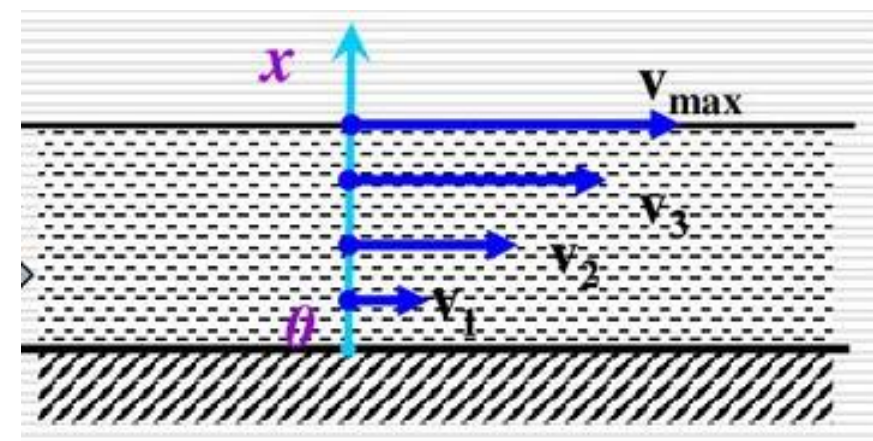
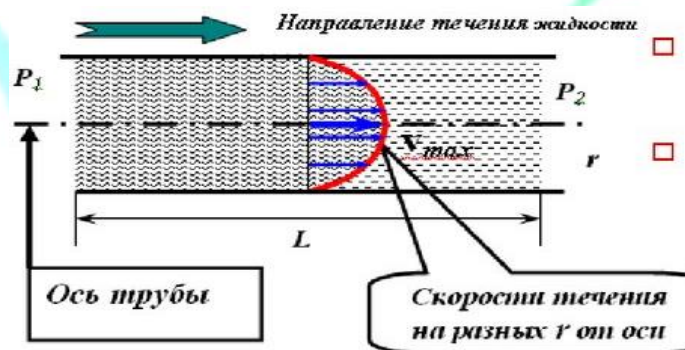
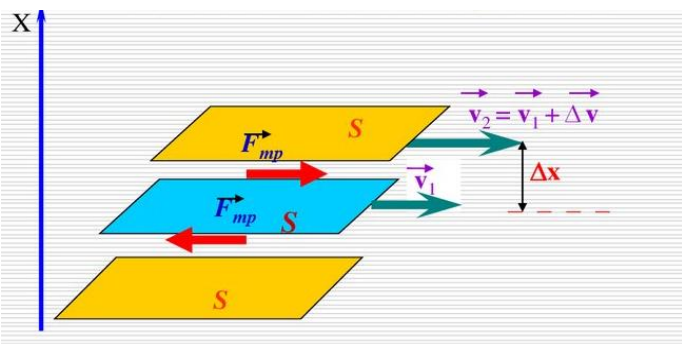
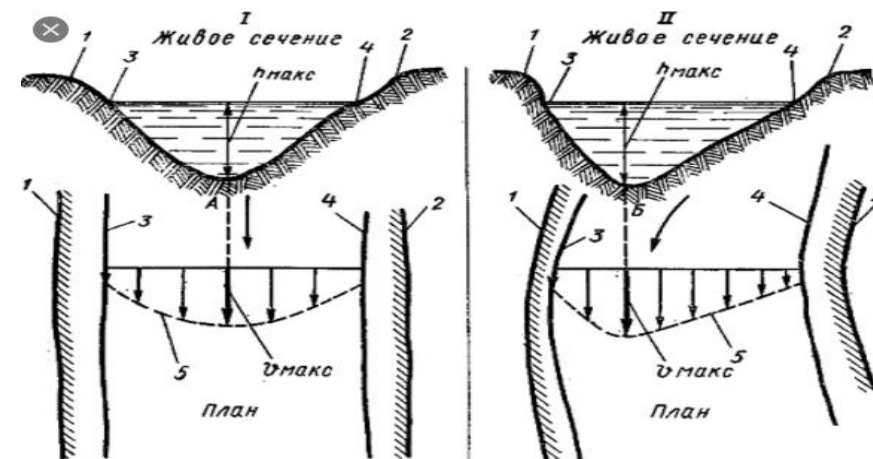
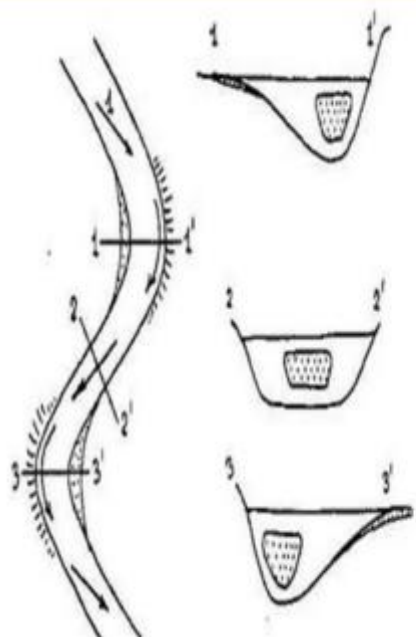
A diagram showing a cross-section of a pipe with water flowing from left to right. Several horizontal arrows of varying lengths represent the velocity profile. A red fish-shaped sensor is positioned in the center of the pipe. A vertical pipe with a float valve is also shown on the right side of the diagram.

Turli gidrotexnik va suv xo'jaligi inshootlarini loyihalash, qurish va ulardan foydalanishda ham o'zanda suvning oqish tezligini hisobga olish zarur bo'ladi.

A photograph of a control room with several computer monitors displaying data. A person is visible in the foreground, looking at the screens. The room is filled with technical equipment and cables.

# Suvning oqish tezligi

Daryo o'zanidagi suv massasining vaqt birligi ichida bosib o'tgan masofasi suvning oqish tezligini ifodalaydi



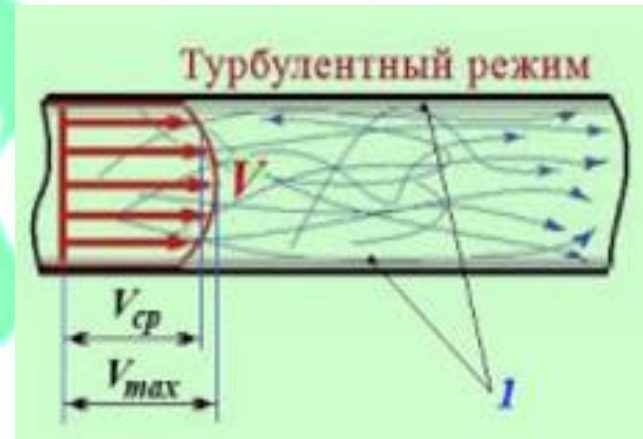
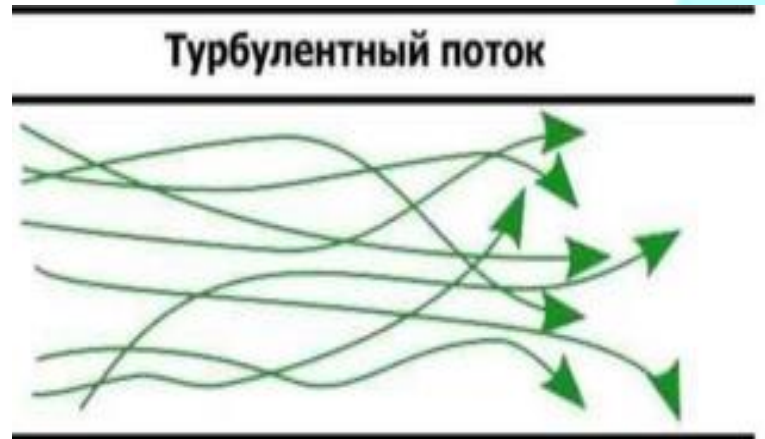


# Suvning oqish tezligini murakkab taqsimlangan bo'lishi sababi

Suvning oqish tezligi jonli kesma bo'yicha juda murakkab taqsimlangan bo'ladi

Chunki

o'zandagi suv massasi aksariyat hollarda turbulent rejimli harakatda bo'ladi.



# Laminar va turbulent rejimli harakatlar

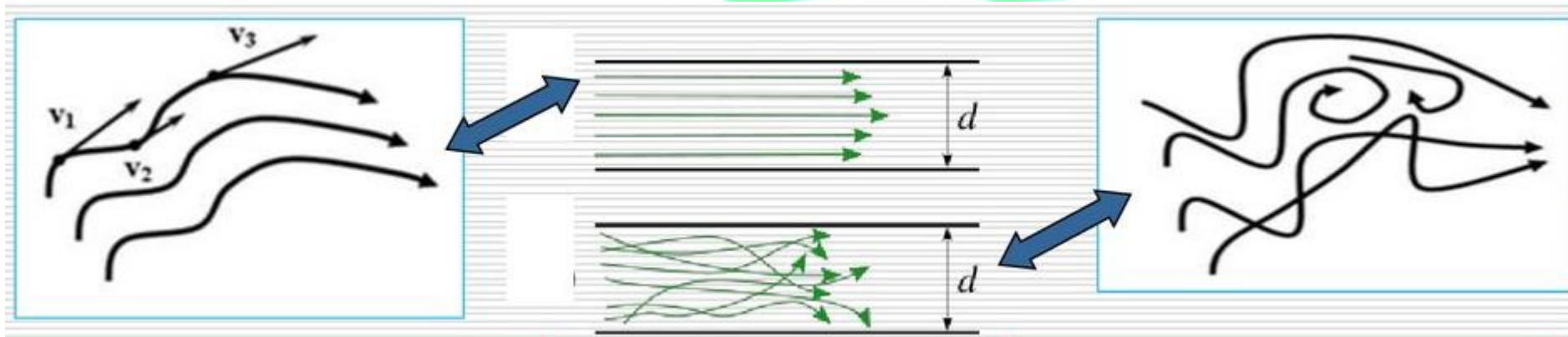
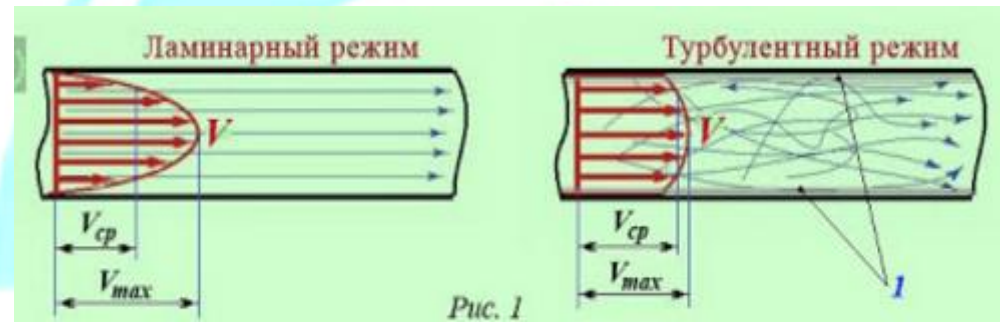
Umuman  
suyuqliklar  
harakati

laminar

va

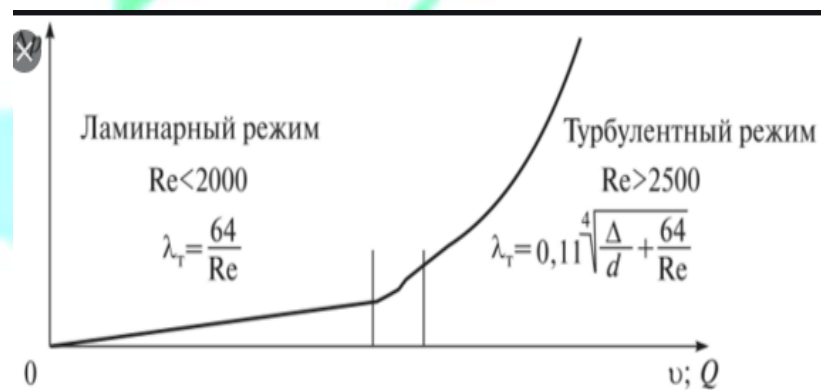
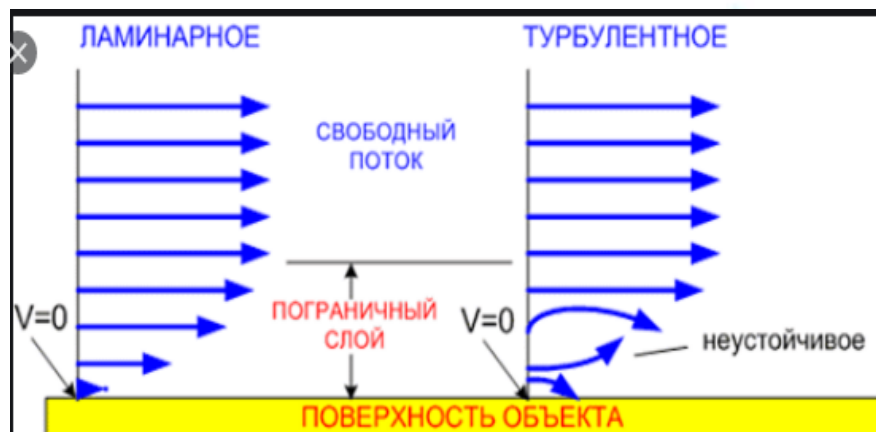
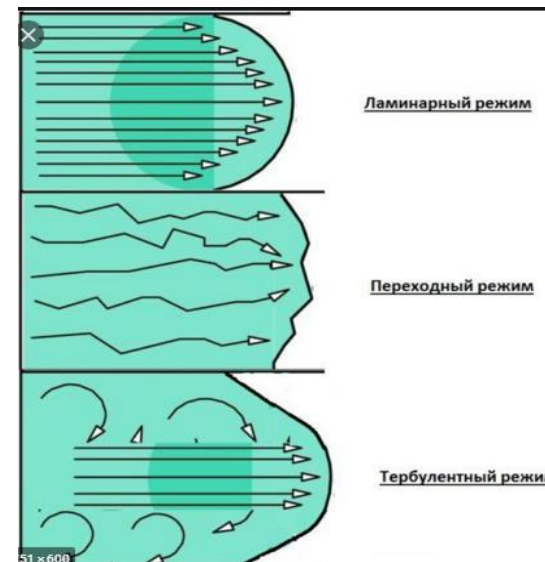
turbulent  
rejimli

rejimli  
harakatlarga  
bo'linadi.

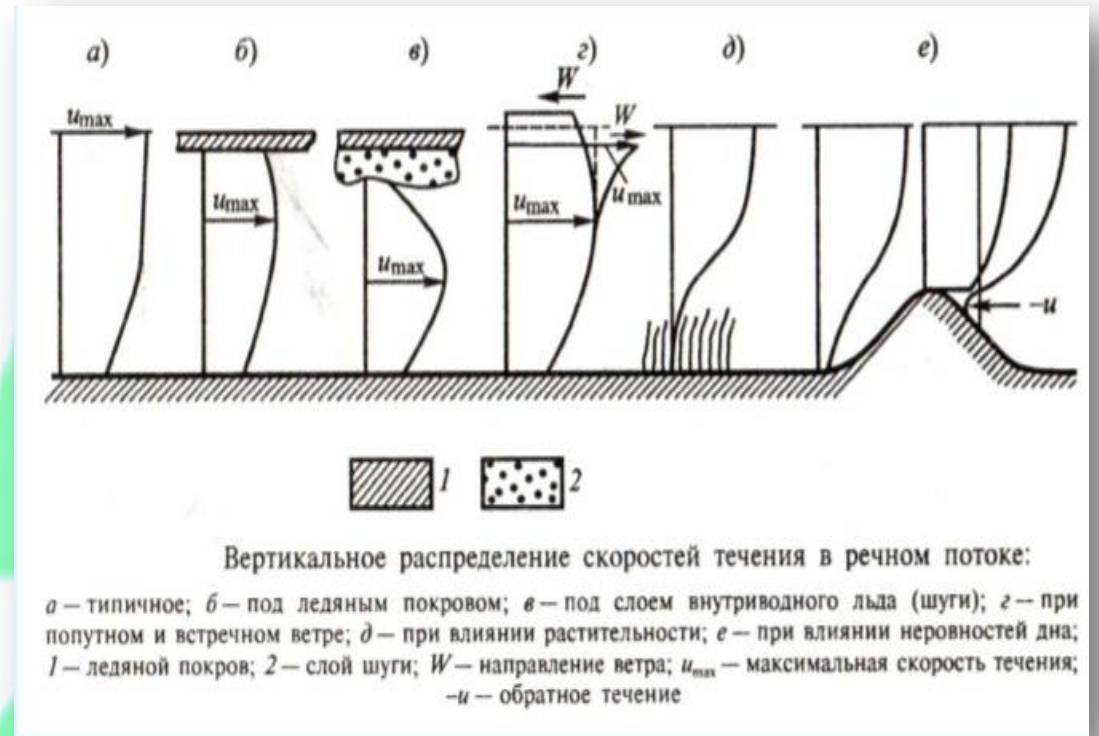
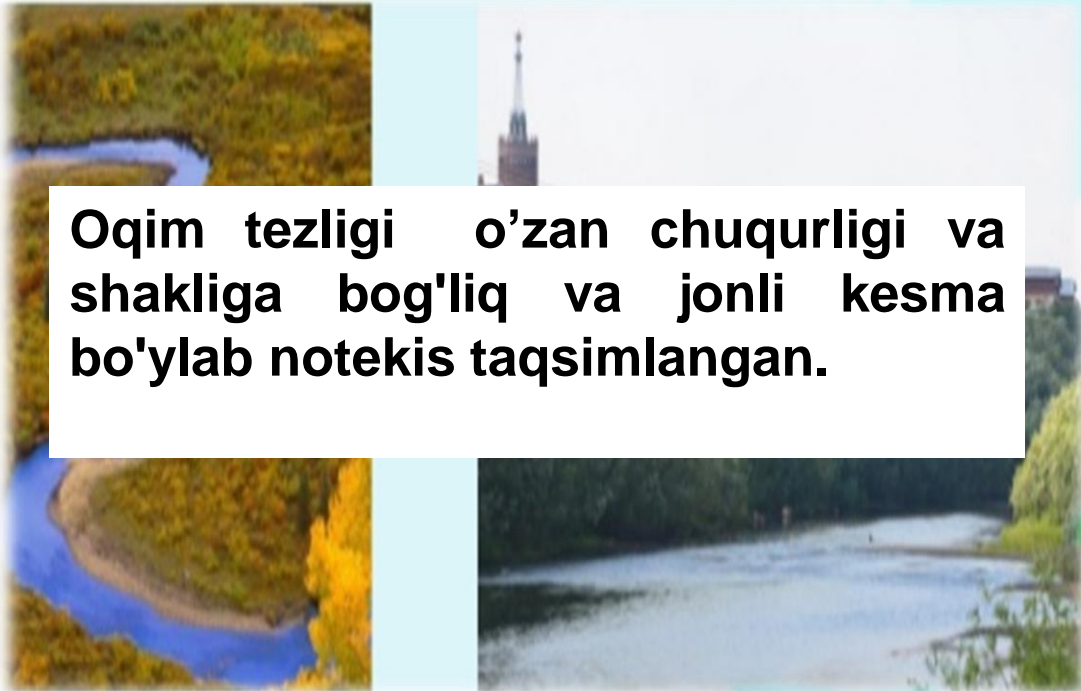


# Laminar rejimli harakat

Laminar rejimli harakatda suyuqlik massasini tashkil etuvchi qatlamlar va zarrachalar bir xil yo'nalishda, o'zaro parallel harakat qiladi



# Oqim tezligi o'zan chuqurligi va shakliga bog'liq notekis taqsimlanganligi



Masalan, oqimning hususiyati to'g'ri uchastkalarda aylanma o'zanli oqimdan farq qiladi

# Daryo oqimida tezlikning taqsimlanishini bog'liqligi

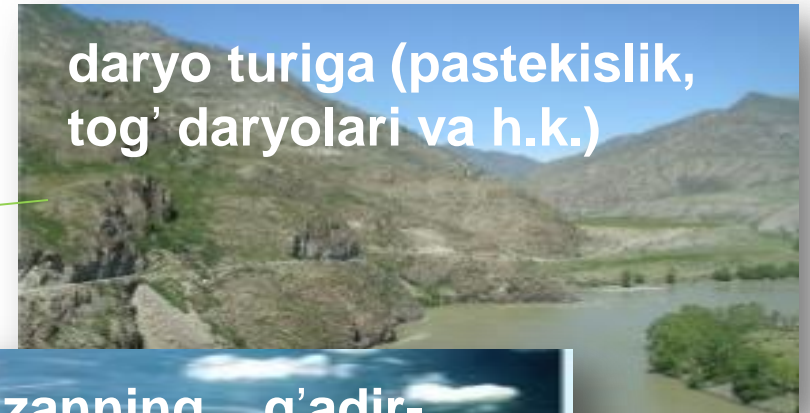
Daryo oqimida tezlikning taqsimlanishi quyidagilarga bog'liq bo'ladi

daryo turiga (pastekislik, tog' daryolari va h.k.)

o'zanning g'adir-budurligiga

suv sathining nishabligiga

morfologik xususiyatlariga

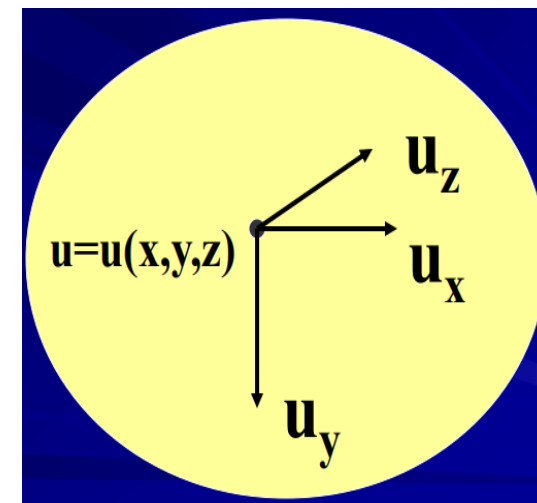
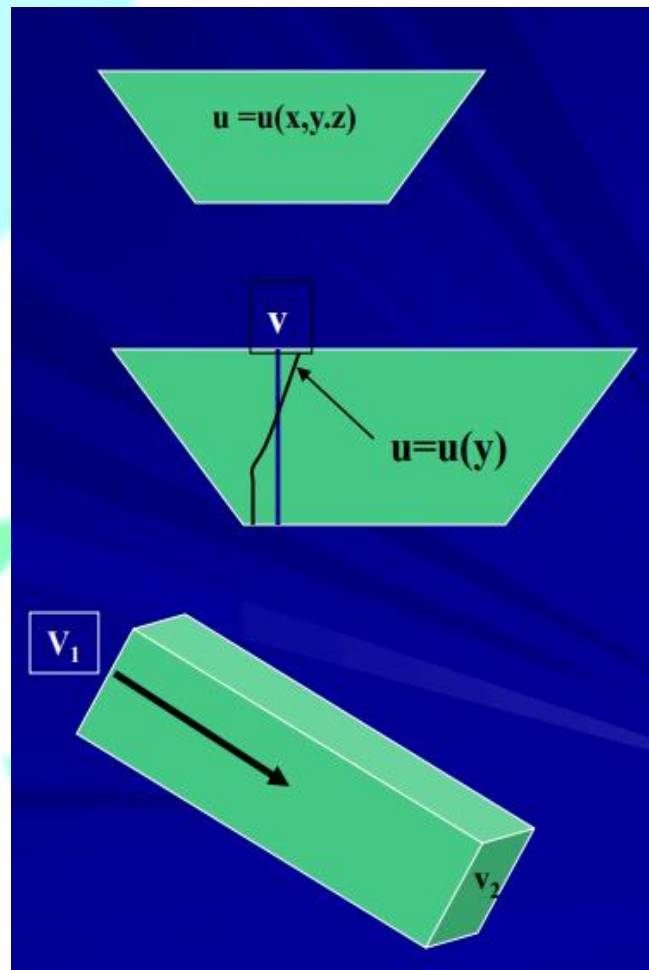


# Tezlik turlari

Mavjud tezliklar

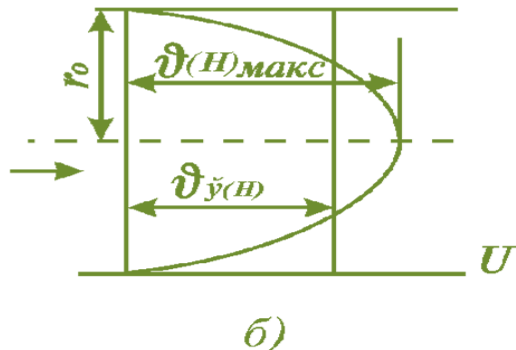
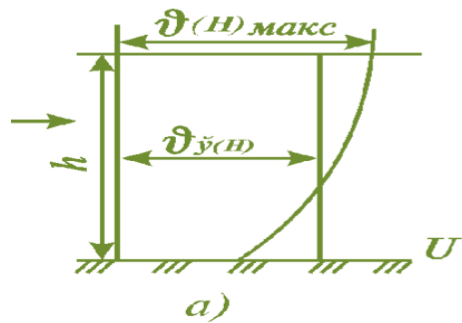
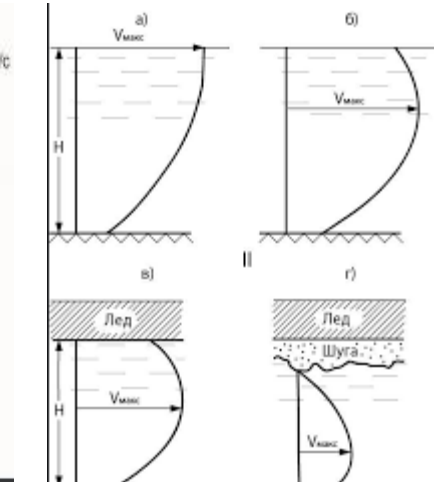
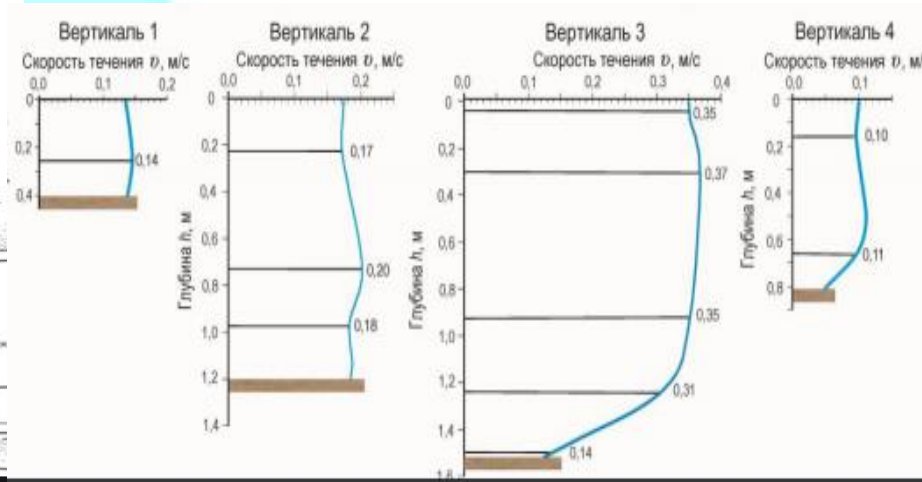
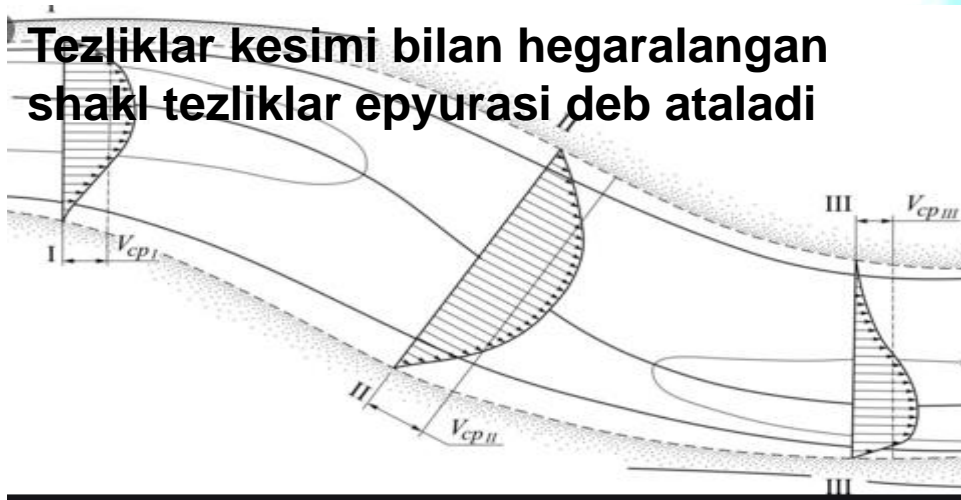
bir onli

o'rtacha yoki mahalliy tezliklar

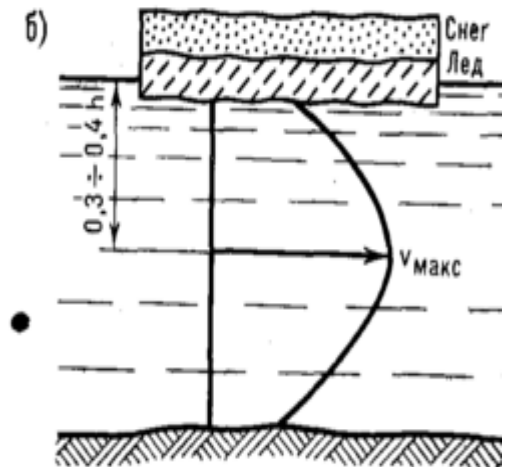
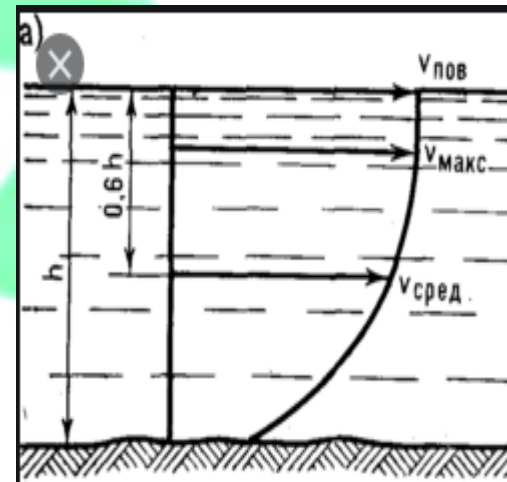


# Tezlik epyurasi

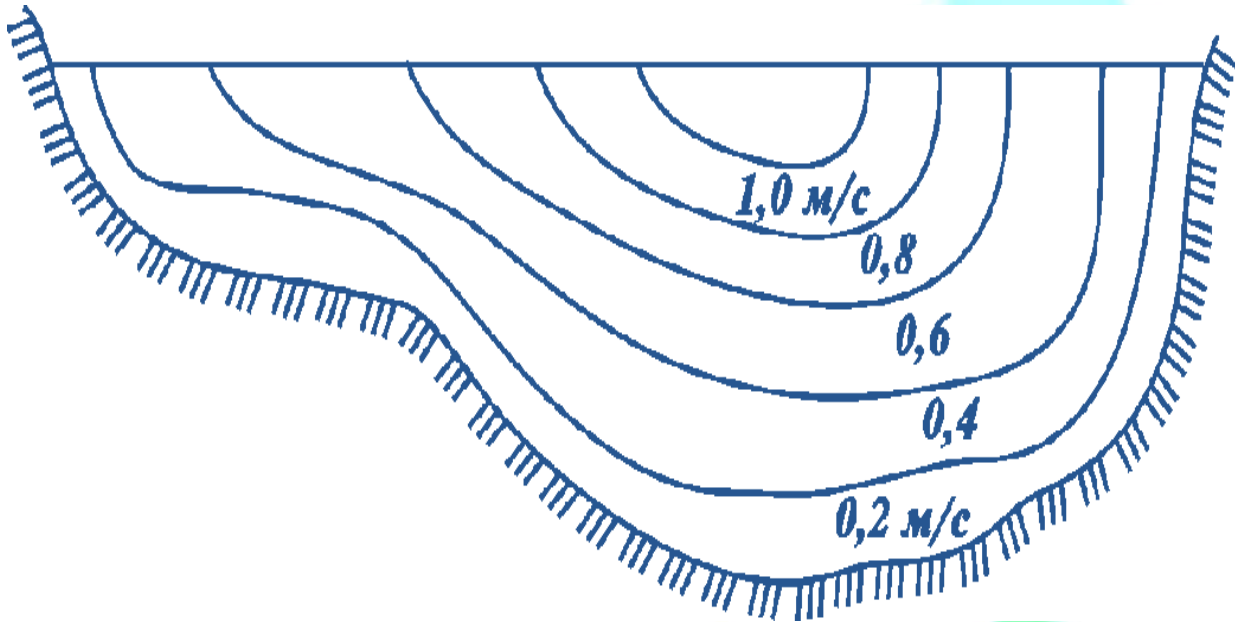
Tezliklar kesimi bilan hegaralangan shakl tezliklar epyurasi deb ataladi



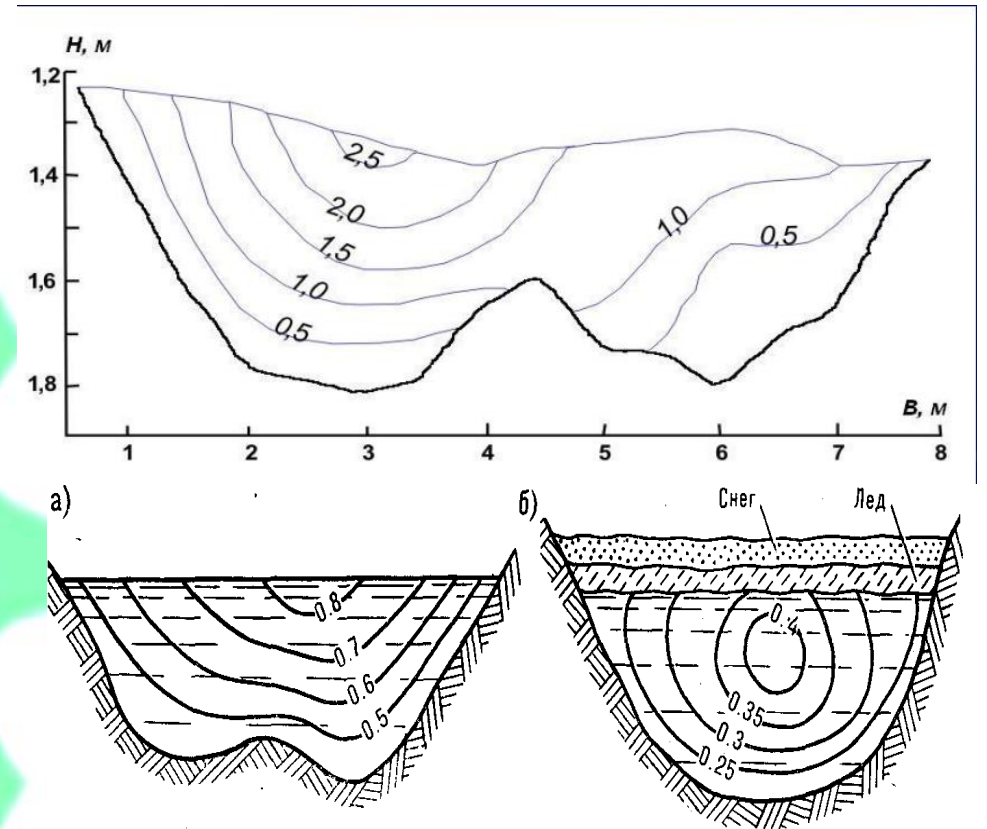
Ochiq (a) va yopiq (quvur) (b) kanallarda o'rtacha suv tezliklarining taqsimlanish epyurasi



# Izotaxalar



Oqim ko'ndalang kesimida miqdor jihatdan bir xil bo'lgan tezliklarni birlashtiruvchi chiziq **izotaxa** deb ataladi.



Oqim ko'ndalang kesimida izotaxalarning tasvirlanishi



# Adabiyotlar:

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- 2.Elizabeth M. Shaw Hydrology in Practice.Third Edition.2005.-145b.
- 3.Rasulov A.R., Xikmatov F.X., D.P. Aytboev. Hidrologiya asoslari, «Universitet», Toshkent, 2003,326 bet.
- 4.Karimov S.K., Akbarov A.A., Jonqobilov U. Hidrologiya, gidrometriya va oqim hajmini rostdash.Darslik. – T.: O‘qituvchi, 2004.-230 b.
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