

OFC9311989030-416

Opening Times:

9A.M – 10 P.M

(All 7 Days Open)



## HIND PHOTOSTATE & BOOK CENTER

Best Quality Hand Written Notes to Crack GATE, IES,  
**PSU's & other Government Competitive/ Entrance Exams**

### CIVIL ENGINEERING

#### MADE EASY

Topper Handwritten Notes

OPEN CHANNEL FLOW

By-Saurbh Chaurasia Sir

F230, Lado Sarai New Delhi-110030 Phone: 9311 989 030	Shop No: 46 100 Futa M.G. Rd Near Made Easy Ghitorni, New Delhi-30 Phone: 8595 382 884	F518 Near Kali Maa Mandir Lado Sarai New Delhi-110030 Phone: 9560 163 471	Shop No.7/8 Saidulajab Market Neb Sarai More, Saket, New Delhi-30 Phone: 9654 353 111
---	--	---	--

Website: [www.HindPhotostate.com](http://www.HindPhotostate.com)

Contact Us: 9311 989 030

Courier Facility All Over India



OPEN

98

CHANNEL

FLOW

1) INTRODUCTION

2) Uniform Flow

3) Energy Depth Relationship

4) Gradually Varied Steady flow

5) Rapidly Varied Steady flow

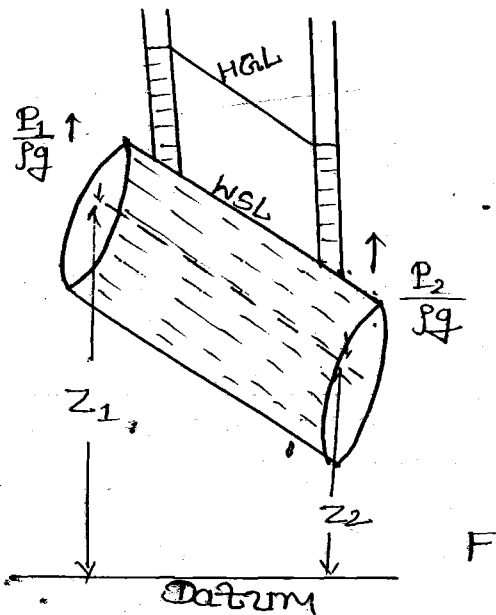
6) Rapidly varied unsteady flow

(1)

⊙

# INTRODUCTION

## PIPE FLOW



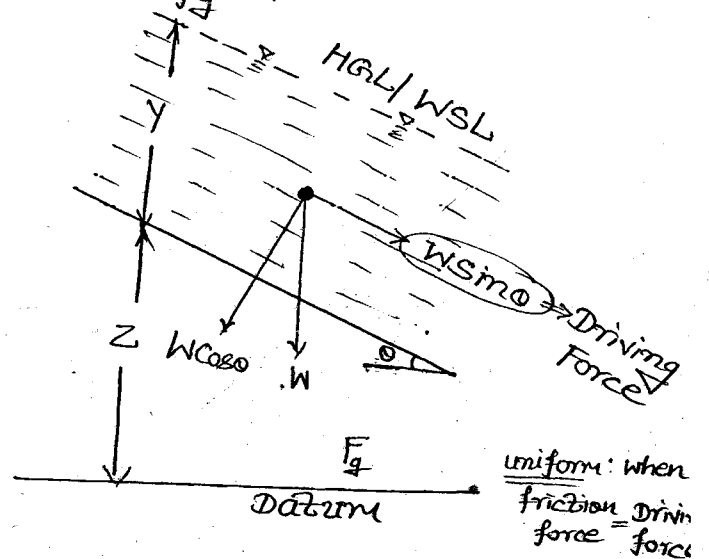
$$HGL = \frac{P}{\rho g} + z$$

- 1) Flow takes place generally due to diffce in  $P^r$ .
- 2) HGL lies above d top surface of  $W^r$ .
- 3) HGL is sum of —  
Datum head ( $z$ ) +  $P^r$  head ( $\frac{P}{\rho g}$ )
- 4) Generally pipes r rounded
- 5) Reynold's no. is used for analysis.

## OPEN CHANNEL FLOW (OCF)

$$P = \rho g y$$

$$\frac{P}{\rho g} = y = \text{Potential head}$$



$$HGL = y + z$$

- 1) Flow takes place due to gravity.
- 2) HGL coincides with top surface of  $W^r$ .
- 3) HGL is sum of —  
Datum head ( $z$ ) + Potential head ( $y$ )
- 4) It can be of any shape such as Rectangular, circular, trapezoid etc.
- 5) Froud No. is used for analysis.

HGL = Hydraulic Grade Line  
WSL =  $W^r$  surface level.

## \* Types of Flow Channel →

1) Natural channel & Artificial channel

2) Prismatic channel & Non-Prismatic channel →

If x-sec<sup>n</sup>, shape & bed slope of any channel remains constant in d dir<sup>n</sup> of flow, then channel is consider to be prismatic otherwise non-prismatic.

NOTE: All Artificial channels can be consider to be prismatic for longer stretch.

3) Rigid & Mobile Boundary channel →

### Rigid

1) Boundaries r non-deformable.

2) No scouring or silting takes place.

3) W<sup>r</sup> is having only 1 degree of freedom that is "depth of flow".

4) Examples -  
Lined Canal or Non-erodible  
un-lined Canal.

### Mobile

1) Boundaries r deformable.

2) Scouring or silting, takes place.

3) W<sup>r</sup> is having 4 D.O.F. such as - "width of channel, shape (depth) flow & bed slope, (Planiform)" & layout

4) Example -  
un-lined Canal.

NOTE In OCF → Channel is consider to be -  
"Prismatic & Rigid boundary"  
or  
(Artificial)

## \* Types of Flow →

1) Steady & Unsteady Flow

2) Uniform & Non-uniform Flow

3) Laminar, Transition & Turbulent Flow →