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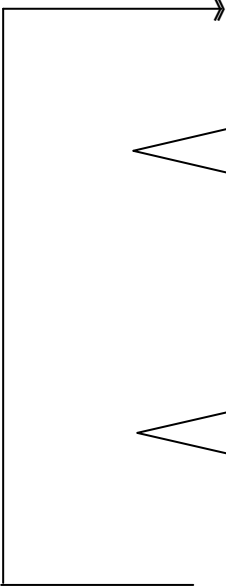
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 WSPRO, HEC-2, HEC-RAS      FastTABS

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 : HEC-6, BRI-STARS  
 .                    (Linear extrapolation)  
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) (Contraction scour)

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(Live-bed scour)  
(Clear-water scour)

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1) ( ) - Laursen (1960)

$$y_2 = y_1 \left[ \frac{Q_2}{Q_1} \right]^{6/7} \left[ \frac{W_1}{W_2} \right]^{K_1} \quad y_s = y_2 - y_1$$

,  $y_s$  : (m)  
 $y_2$  : (m)  
 $y_1$  : (m)  
 $Q_1$  : (m<sup>3</sup>/sec)  
 $Q_2$  : (m<sup>3</sup>/sec)  
 $W_1$  : (m)  
 $W_2$  : (m)  
 $K_1$  :  
 $V^*$  : (m/sec) =  $(gy_1S_1)^{1/2}$   
 $W$  :  $D_{50}$  (m/sec)  
 $S_1$  : (m/m)

2) ( ) - Laursen (1963)

$V^*/W$	$K_1$	
< 0.5	0.59	
0.5 ~ 2.0	0.64	
> 2.0	0.69	

$$y_s = y_1 \cdot 0.13 \left[ \frac{Q}{D_m^{1/3} y_1^{7/6} W} \right]^{6/7} - 1$$

,  $y_s$  : (m)

$y_1$  : (m)

$Q$  : ( $m^3/s$ )

$D_m$  : ( $1.25D_{50}$ ) (m)

$W$  : (m)

) (Local scour)

1)

30 가

가

CSU

- CSU(Colorado State University)

$$y_s = 2.0 \cdot a \cdot K_1 \cdot K_2 \cdot K_3 \cdot (y_1 / a)^{0.35} \cdot Fr_1^{0.43}$$

,  $y_s$  : (m)

$K_1$  :

$K_2$  :

$K_3$  :

$a$  : (m)

$L$  : (m)

$y_1$  : (m)

$Fr_1$ : Froude

	K <sub>1</sub>
	1.1
	1.0
	1.0
	0.9
	1.0

	K <sub>2</sub>		
	L/a = 4	L/a = 8	L/a = 12
0	1.0	1.0	1.0
15	1.5	2.0	2.5
30	2.0	2.5	3.5
45	2.3	3.3	4.3
90	2.5	3.9	5.0

	, H(m)	K <sub>3</sub>
		1.1
		1.1
	3.048> H > 0.6096	1.1
	9.144> H > 3.048	1.1 ~ 1.2
	H > 9.144	1.3

2)

Liu, Laursen, HIRE,  
Froehlich

- HIRE

$$y_s= 4y_1 \left[ \frac{K_1}{0.55} \right] K_2 Fr_1^{0.33}$$

, y<sub>s</sub> : (m)  
y<sub>1</sub> : (m)  
K<sub>1</sub> :  
K<sub>2</sub> : {K<sub>2</sub> = ( / 90 ° )<sup>0.13</sup>  
:  
Fr<sub>1</sub>: Froude

- Froehlich

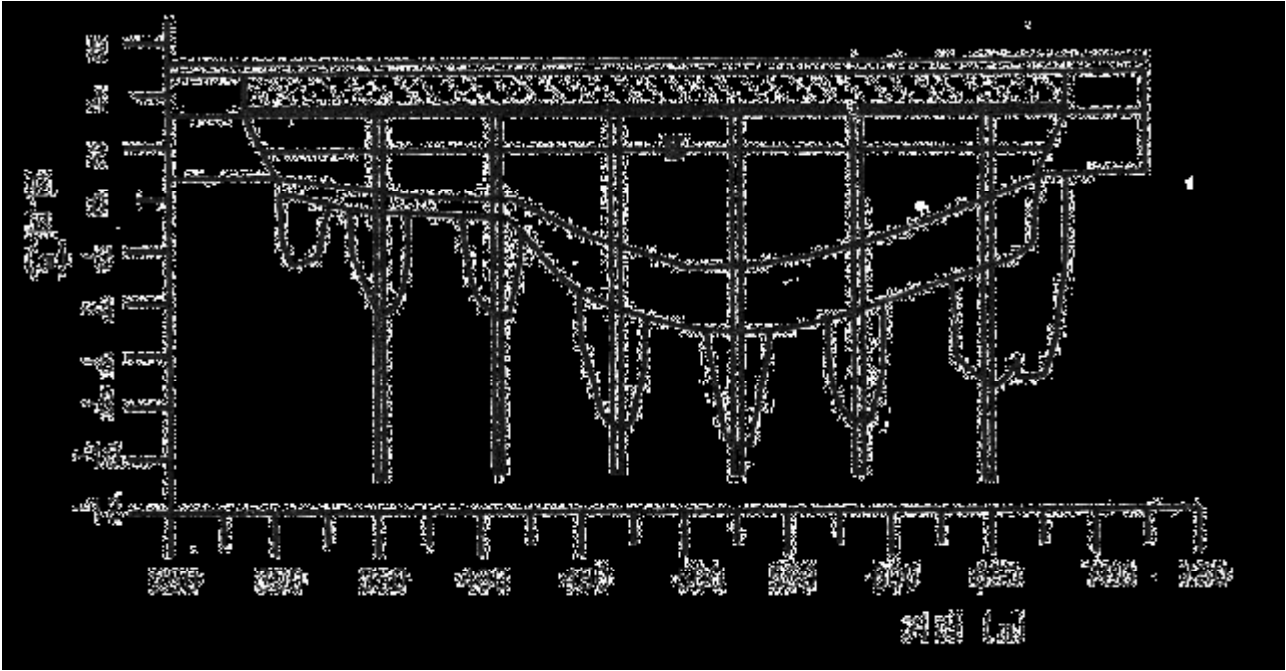
$$y_s = 2.27 \cdot K_1 \cdot K_2 (a')^{0.43} \cdot y_a^{0.57} Fr^{0.61} + y_a$$

, y<sub>s</sub> : (m)  
K<sub>1</sub> :  
K<sub>2</sub> : {K<sub>2</sub> = ( /90 ° )<sup>0.13</sup>  
a' : (m)  
y<sub>a</sub> : (m)  
Fr : Froude

	K <sub>1</sub>
	1.0
	0.85
	0.55

4	4	(圖示)
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- 1) , ,
- 2) ( 2.8 ) .



5	5	가
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- 1) 가 .
- 2) .
- 3) , , , 가
- 4) 가
- 5) , 가 .
- 6) .

6	6	가
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가 , , .

7	7	
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1) 4

2) 가 가

8	8	
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1) 2 ~ 6

2) 500 , 100  
1.7

3) 500  
가  
500

7 가  
가  
1.0 가

3)

가)

1) ,

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3)가 :

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1) .

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- 5)
- 6)
- 7) (relief bridge)
- 8)
- 9)
- 10)
- )

Isbach(1935), Richardson(1993)

( , 1996)

$$D_p = 0.00317 \frac{b^{0.3850} B^{3.6207}}{y^{3.0057}}$$

$$D_p = 0.2164 \frac{u^{1.6818} b^{0.2017} y_0^{0.3611}}{g^{0.8409} B^{0.4036}}$$

$$D_p = 0.00317 \frac{b^{0.3850} B^{3.6207}}{y^{3.0057}}$$

$$D_p = 0.0880 \frac{u^{1.3233} b^{0.2408} B^{0.4540}}{g^{0.6616} y_0^{0.3564}}$$

,  $D_p$ : (m),  $u$ : (m/sec)  
 $y_0$ : (m),  $y$ : (m)  
 $b$ : (m),  $B$ : (m)  
 $g$ : 가 (m/sec<sup>2</sup>)

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- 2
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- $D_p$   $D_{50}$ ,  $D_{50}$  2