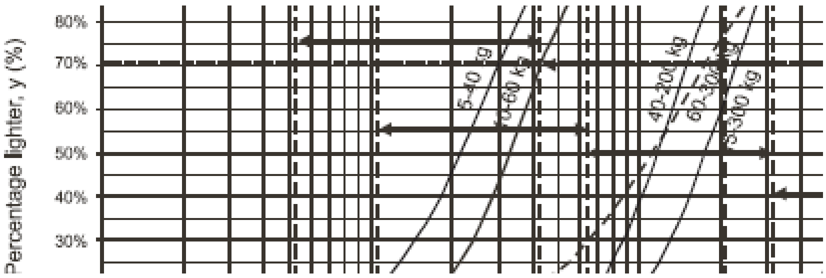
NOTES: This list of 5 December 2017 refers to the B/W version of 2012, which is a reprint of the original Manual of 2007. That reprint contains, contrary to the statement in the preface, not all errata until 2012. The red page numbers refer to errata already in the list of December 2011. **Black page numbers** refer to a new item, or an erratum specific for the reprint. Page numbers with an asterisk refer to new errata as compared with the list of February 2016. These new errata are on the following pages: **xxxii, xxxiii (twice), 173, 218, 253, 260, 280, 287, 323, 373, 411, 437, 440, 442 (twice), 455, 530, 532, 533, 535, 536, 545, 547, 548, 555, 577, 598, 617, 618 (three times), 623, 639, 650, 654, 661 (twice), 721 (correction), 726, 745 (four), 746 (twice), 748, 852, 892, 1008 (twice), 1033, 1034, 1103, 1107, 1108, 1122, 1142, 1146, 1187**

Page No	Erratum / Correction
xxvii	**Incorrect definition of (notation) of D_{n50}:** 'Median' (being the middle number) is not the correct statistical value, to be deleted D_{n50} Median nominal diameter, or equivalent cube size, $D_{n50} = (M_{50}/\rho_{app})^{1/3}$ D Diameter of ship propeller; diameter of pipe The definition of D_{n50} has to read: "Nominal stone diameter, …". **Notes**: 1. This erratum referring to D_{n50} is on numerous places in the Manual and therefore restricted to this one, without cross references to all pages concerned. 2. The word "median" is in many instances in the main text also added to the (definition of the) sieve size D_{50}. Also this is incorrect, as this value is defined by the 50% value of the total mass, being 50% of the sieve curve, as defined on page xxviii. 3. The same applies to (the definition of) M_{50}. As this value is also defined by the 50% value of the total mass (see page xxx), the word "median" should be ignored in those instances.
xxxiii	**Ambiguous guidance of notation Δ** "Δ Relative buoyant density of " has to read: "Δ Relative submerged density of ". **Note:** this erratum is also on the following pages: 96 ,129, 438, 527, 537, 539, 546, 563 [3 x], 564, 567, 570 [2 x], 572, 580, 588, 602, 603, 604, 607, 609, 611, 616, 617 [2 x], 626, 633, 649, 650, 651, 890, 924, 949, 1034, 1060, 1104, 1105, 1263.
xxxii *	**Notation s_o**: incorrect definition, T_m has to read T s_o Fictitious wave steepness, defined as $H_s/L_o = 2\pi H_s/(gT_m^2)$ The correct definition is: $s_o = 2\pi H_s/(gT^2)$
xxxiii *	**Notation *WA***: incorrect definition; see also page 96 WA Water absorption, $WA = (\rho_w/\rho_{rock})\, p/(1-p)$ The correct definition is: $WA = M_w/M_{rock} = (\rho_w V_P)/(\rho_{rock} V_T) = (\rho_w/\rho_{rock})\,p$

Page No	Erratum / Correction
xxxiii *	**Notation: additional parameter, below β = horizontal slope**: β_{Iz}; see also page 654 β_{Iz} Stability factor in the formula, based on Izbash, for the evaluation of the stability of armourstone subject to ship-induced currents (Equation 5.226)
111	**Figure 3.20, middle figure for light armourstone:** incorrect line indication  The dashed line refers to 15-300 kg, instead of 60-300 kg. The line to the right refers to 60-300 kg, instead of 15-300 kg.
115	**5th and 6th line from below:** incorrect guidance of a D_{n50} value calculated from D_{50} ($D_{n50} = 0.84D_{50}$) specified in Table 3.6, column (b). This is a conservative approach since in most cases the delivered material will have a greater D_{50}. The sentence "This is … D_{50}." has to read: "This is, however, not a conservative approach since in most cases the delivered material will have a smaller D_{50}."
165	**Equations 3.54 and 3.55 in Box 3.14: typographic errors:** $M_{T(Sr=0)}$ in the last term is incorrect, as $\rho_w V_H = M_{T(Sr=0)} - M_H$ (Archimedes law) **Apparent mass densities are determined as follows:** $\rho_{app(Sr=0)} = M_{T(Sr=0)}/V_{TG} \cong M_{T(Sr=0)}/V_{TH} \cong \rho_w \times M_{T(Sr=0)}/[M_{T(Sr=0)} - M_H]$ (3.54) $\rho_{app(Sr=1)} = M_{T(Sr=1)}/V_{TG} \cong M_{T(Sr=1)}/V_{TH} \cong \rho_w \times M_{T(Sr=1)}/[M_{T(Sr=0)} - M_H]$ (3.55) The Equations have to read: Eq. 3.54: $\rho_{app(S_r=0)} = M_{T(S_r=0)}/V_{TG} \cong M_{T(S_r=0)}/V_{TH} \cong \rho_w \times M_{T(S_r=0)}/\lfloor M_{T(Sr=1)} - M_H \rfloor$ Eq. 3.55: $\rho_{app(S_r=1)} = M_{T(S_r=1)}/V_{TG} \cong M_{T(S_r=1)}/V_{TH} \cong \rho_w \times M_{T(S_r=1)}/\lfloor M_{T(Sr=1)} - M_H \rfloor$
173 *	**Box 3.18: 6th line below Table 3.23:** Typing error, D_f i.s.o. D_p integrity ranking based on values of both the degree of fissuration, D_p (%), and the continuity index, I_c (%), are given in Table 3.24. "the degree of fissuration, D_p (%)" → "the degree of fissuration, D_f (%)

Page No	Erratum / Correction

218 *

Table 3.32: typographic error: kg → mm

Table 3.32 ***Limitation of screening device to limit damages***

	Maximum feed size
Grizzly	~ 120 kg

The maximum feed size should be "120 mm" i.s.o. "120 kg"

253 *

Table 3.46, Equation 3.90: typing error, "*n*" → "N_a"

Armour layer porosity	$n_v = 1 - \frac{n V}{A t_a} = 1 - \frac{k_s^{2/3}}{X_c Y_c k_t} = 1 - \frac{1}{X Y k_t}$	(3.90)

The first part of the correct formula reads: $n_v = 1 - \frac{N_a V}{A t_a}$

260 *

Table 3.47: ambiguous guidance for cubes in two layers

Table 3.47 ***Characteristic geometric and armour layer parameter values of randomly placed concrete armour units***

		Layer coefficient	Shape coefficient	Distance between units		Porosity	Packing density coefficient	Modified layer coefficient	Recommended slope
				Horizontal	Slope-parallel				
Armour unit type	Size (m³)	k_t (-)	k_s (-)	$\Delta x/D_n$ (-)	$\Delta y/D_n$ (-)	n_v (-)	ϕ (-)	k_c	cot α (-)
Cube (two layers)		1.10	1.0	~~1.70~~	~~0.85~~	0.47	1.17	1.10	

The distances between units [i.e. 1.70 and 0.85] need to be deleted, as this type of CAU's are randomly placed.

280 *

First line above subsection 3.15.2.1: unclear cross reference, and
3rd / 4th line of subsection 3.15.2.1: unclear guidance as total percentage > 100%

found in the TAW *Technical report on the use of asphalt in water defences* (TAW, 2002).

3.15.2.1 ***Asphaltic concrete***

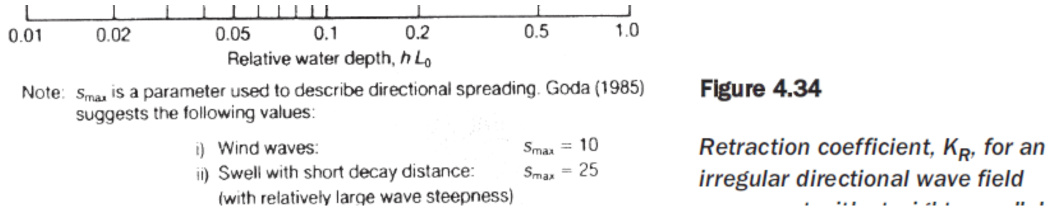
Asphaltic concrete is a continuously graded mixture of crushed stone or gravel, sand and filler in which the pores (voids) are almost entirely filled with bitumen. The mixture usually consists of crushed stone or gravel (50 per cent), sand (42 per cent), filler (8 per cent) and bitumen (6.5 per cent).

- "(TAW, 2002)" has to read: "(TAW, 2002b)"
- "(6.5 per cent)" has to read: "(6.5 per cent of the total of mass of gravel, sand and filler)"

Page No	Erratum / Correction
287 *	**Third line from above:** typing error Where the geotextile is expected to be experience high load and prevent spreading or slip failure of the embankment, there is a requirement for high tensile strength with low "to be experience" has to read: "to experience".
323 *	**7th line / 4th bullet of section 4.2.2:** incorrect guidance / typing error • a structure may be exposed (and possibly vulnerable) to different risks for different water levels, in turn dependent upon SWL "upon SWL" has to read: "upon MWL (Mean Water Level)"
357	**Equation 4.54:** mathematical operator 'error function' (erfc) not in italic type $\frac{H_{1/Q}}{H_{rms}} = \frac{\sqrt{\pi}}{2} Q \, erfc\left(\sqrt{\ln Q}\right) + \sqrt{\ln Q} \quad , \quad erfc(x) = \frac{2}{\sqrt{\pi}} \int_x^{+\infty} \exp(-t^2)\, dt$ (4.54) The correct Equation(s) are: $\frac{H_{1/Q}}{H_{rms}} = \frac{\sqrt{\pi}}{2} Q \, \mathrm{erfc}\left(\sqrt{\ln Q}\right) + \sqrt{\ln Q}, \quad \text{where } \mathrm{erfc}(x) = \frac{2}{\sqrt{\pi}} \int_x^{+\infty} \exp\left(-t^2\right) \mathrm{d}t$
365	**9th line from above:** typographic error, pi <u>not</u> in italic font! where: $\omega_h = 2\pi \, f \sqrt{h/g}$. The equation has to read: $\omega_h = 2\mathrm{\pi} \, f \sqrt{h/g}$
373	**Equation 4.93**: left hand side is incorrect: U_{10} instead of U_{10}^2 $\frac{gT_p}{U_{10}^2} = 7.519 \left(\tanh A_2 \tanh\left(\frac{B_2}{\tanh A_2} \right) \right)^{0.37}$ (4.93) This Equation has to read: $\frac{gT_p}{U_{10}} = 7.519 \left(\tanh A_2 \tanh\left(\frac{B_2}{\tanh A_2} \right) \right)^{0.37}$
373 *	**5th line from below**: typing error Both these parameters are present is the above formulae. "present is" has to read: "present in"

<table>
<tr><th>Page No</th><th>Erratum / Correction</th></tr>
<tr><td>376</td><td>

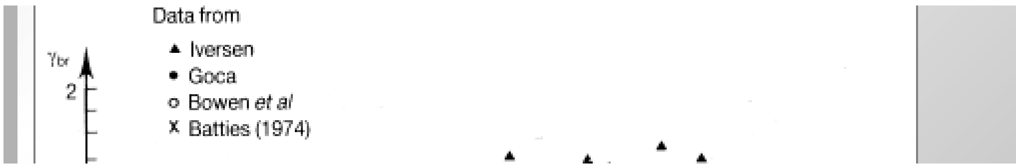
Figure 4.34: typographic errors in label to x-axis and in the caption



1. label to x-axis: “*h L*₀” to read: “h/L_o”
2. caption: “Retraction” to read: “Refraction”

</td></tr>
<tr><td>381</td><td>

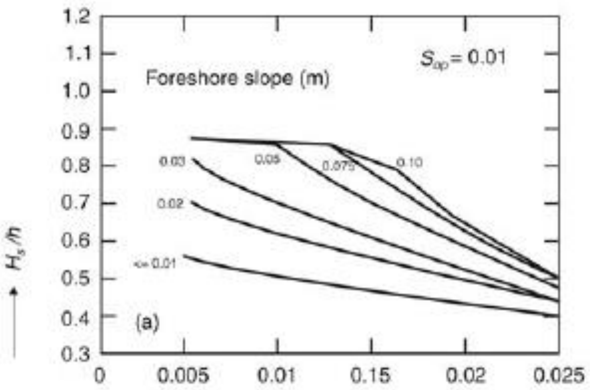
Figure 439: typographic errors in legend



1. “Goca” to be written as “Goda”;
2. “Batties” to be written as “Battjes”

</td></tr>
<tr><td>382</td><td>

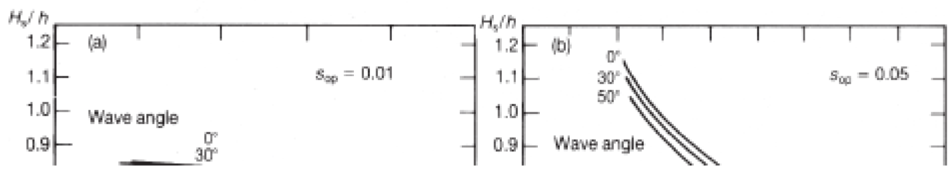
Figure 4.40: incorrect label to the y-axis (5 times)



The label “H_s/h” has to read (cf Box 4.8): “H_{m0}/h”.

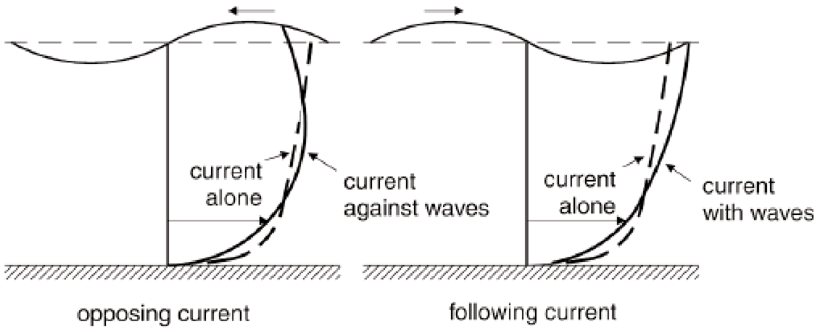
</td></tr>
<tr><td>383</td><td>

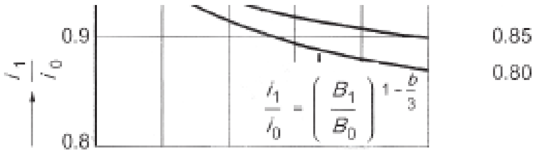
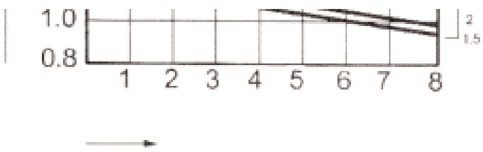
Figure 4.41: incorrect label to the y-axis (2 times)



The label “H_s/h” has to read (cf Box 4.8): “H_{m0}/h”.

</td></tr>
</table>

Page No	Erratum / Correction
384	**Box 4.9 – 6th line from below:** typographic errors Goda (2000) advises that this numerical formula may overestimate wave heights by several per cent. In particular, for waves of steepness greater than 0.04, the formulae overestimate significant wave heights "this numerical formula" → "these numerical formulae"
384	**Same box 4.9, last line of Table 4-14:** typographic error (index 'max' in italic font) $\beta_{\mathrm{max}} = \max\left\{0.92, 0.32(H'_0/L_o)^{-0.29}\exp(2.4m)\right\}$ $\beta^*_{max} =$ "β_{max} " has to read: "β_{max} "
411 *	**Box 4.13, 6th line of 4th bullet text:** incomplete wording itation runs off. The gradex thus makes it possible to extrapolate the distribution of discharges beyond the usual limiting return period. "The gradex thus" has to read: "The gradex method thus"
421	**Figure 4.62:** printing mistake as for the two arrows The correct Figure is as below:  **Figure 4.62** *Effect by waves on the velocity profile*
423	**1st line above Figure 4.65:** typographic error, parameter 'C' in Italic type the outer bend. As a result, the flow velocity, v (m/s), in the outer bend is higher than in the inner bend, v = C $\sqrt{(h\,i)}$. mean level water surface The line has to read: "inner bend, $v = C\sqrt{(h\,i)}$."
424	**A Note to be added after last line of the page** "**NOTE:** Combining Equation 4.157 (+ 4.156) with Equation 4.154 [using $Q = B\,U\,h$] will give the equation in the upper part of Figure 4.67. Combining this 'upper' equation with Equation 4.155 (considering Equation 4.154) will give the equation in the lower part of Figure 4.67. "

Page No	Erratum / Correction
425	**Figure 4.67:** incorrect power factor of the right hand side of the equation in lower part  **Figure 4.67** *Consequences of a horizontal river constriction for the equilibrium river depth* The equation in the lower part of the Figure has to read: $\frac{i_1}{i_0} = \left(\frac{B_1}{B_0}\right)^{1-\frac{3}{b}}$
428	**Figure 4.69:** label to x-axis is missing  **Figure 4.69** *Shear stress, transverse distribution (after 1995 edition)* The label to the x-axis (to be inserted just to the right of the arrow) is: "*B*/*h*"
435	**15th line from below:** incorrect, ambiguous guidance • ship position, relative to the fairway axis y (m) or bank y_s (m) The position reference for y differs from that of y_s; the text has to read: • ship position, relative to the fairway axis y (m), between axis and ship's centre line, or to the bank y_s (m), between ship's hull and the bank
437 *	**1st line of step 5 / 1st line above Eq. 4.175**: incorrect dimensions indication **5 Maximum water level depression, $\Delta\hat{h}$ and return flow, $\hat{U}_r$** The maximum water level depression, $\Delta\hat{h}$ (m/s) can be calculated by Equation 4.175: "(m/s) can be" has to read: "(m) can be"
438	**1st line above Equation :** incorrect guidance where $z_0 = 0.16\, y_s - c_2$, $y_s = 0.5\, b_w - B_s - y$, $c_2 = 0.2$ to 2.6. $u_{max} = V_s\left(1 - A D_{50}/z_{max}\right)$ (4.181) The definition of y_s has to read (see also erratum above for page 435, ship position): $y_s = 0.5 b_w - 0.5 B_s - y$

Page No	Erratum / Correction
440 *	**Line above subsection 4.3.4.3:** typing error α_i = 1 for unloaded push units. ***4.3.4.3 Propeller jet velocities*** The value of the coefficient α_i for unloaded push units has to be: 0.5 (i.s.o. 1)
441	**Equation 4.190:** as it was, it was only valid for non-sailing ships with single propellers; therefore, a factor to be added and a term for sailing ships; and a Note to be added Maximum bed velocity along horizontal bed (see Equation 4.190): $u_{p,maxbed} = c\, u_{p,0} \left(D_0 / z_p\right)^n$ (4.190) - This Equation 4.190 has to read: $u_{p,max,bed} = f_n\, c\, u_{p,0} \left(D_0 / z_p\right)^n - 0.5V_s$ - Definition of z_p (19th line from below) has to read: "z_p = distance between the propeller axis and the bed for a non-sailing ship (m)." - To be inserted just above the 18th line from below: "**NOTE**: Equation 4.190 is valid for ships with one or more than one propeller. In the latter case, the applied power per propeller has to be used (in Equation 4.187) and the factor f_n (in Eq. 4.190) is equal to $\sqrt{n_p}$, where n_p is the number of propellers."
442 *	**First to 5th line below Figure 4.87:** ambiguous and incorrect guidance The calculated propeller jet velocities can be used with Equation 5.226 in Section 5.2.3.1 for the design of armourstone bed and slope protection against propeller jet attack. This equation includes a turbulence factor, k_t^2 (see also Section 4.3.2.5) to take into account turbulence levels, as the propeller jet velocities given by Equations 4.187 to 4.190 are time-averaged velocities and stability is determined by turbulent peak velocities. As the turbulence factor in the Equation 5.226 has been adapted / changed (see erratum page 654), the text in this paragraph has to be changed as follows: "a turbulence factor, k_t^2 (see also Section 4.3.2.5) to take into account " has to read: "a specific turbulence factor, β_{Iz}, to take into account "
442 *	**Second paragraph below Figure 4.87:** ambiguous and incorrect guidance Different values of the turbulence factor for propeller jets can be found in literature. It is important that the value for the turbulence factor is selected in combination with the value for the coefficient c in Equation 4.190 (and thus a, b and m). PIANC (1987) presents for the turbulence coefficient a value that can be converted into: k_t^2 = 5.2. Design experience has shown that this value for the turbulence coefficient together with c = 0.3 can be used for cases when vessels are often not fully loaded and the berthing position is not always the same. If the maximum impact of the propeller jet occurs frequently and always at the same place (ro-ro and ferry) a value of k_t^2 = 6 is recommended together with c = 0.3.

Page No	**Erratum / Correction**
	With reference to the erratum given above, parts of the text of this paragraph have to be changed as follows: - "in combination with the value for the coefficient c in Equation 4.190 (and thus a, b and m)." has to read: "in combination with both the equation used to evaluate stability and the value for the coefficient c in Equation 4.190 (and thus a, b and m)." - "converted into $k_t^2 = 5.2$." has to read: "converted into $\beta_{Iz} = 2.6$; see also Equation 5.226 (Section 5.2.3.1). " - "a value of $k_t^2 = 6$ is recommended " has to read: "a value of $\beta_{Iz} = 3$ is recommended "
455 *	**Last line:** typing error, "excavation" to be deleted Indicative depths of investigation (below the lowest point of the foundation or excavation base excavation) are given in Table 4.21 and may be used as guidance. "base excavation) are given" has to read: "base) are given"
493	**Equation 5.9(maximum of wave run-up):** the berm factor, γ_b, to be added. $R_{u2\%}/H_{m0} = \gamma_f \gamma_\beta \left(B - C/\sqrt{\xi_{m-1,0}}\right)$ (5.9) Please note that this erratum has not yet been corrected in the source documents (TAW, 2002a) and the EuroTop Manual (EA, ENW, KFKI, 2007). The Equation has to read: $R_{u2\%}/H_{m0} = \gamma_f \gamma_\beta \left(B - C/\sqrt{\gamma_b \xi_{m-1,0}}\right)$
530 *	**5th line from below**: typing error, b_t i.s.o. h_t h_t = gap width (m) between both toes of the dam heads (see Figure 5.24) "h_t = gap width" has to read: "b_t = gap width"
532 *	**Box 5.8, 4th line**: incorrect cross references is related to the relative size of the closure gap (ie width, b (m), and sill height, d (m)), and is furthermore dependent on the values of $(H - h_b)$ or H for a vertical closure (see Equations 5.92 and 5.93) and the value of $(h_1 - h_2)$ for a horizontal closure (see Equation 5.94). The key difference between the two methods is "(see Equations 5.92 and 5.93)" has to read: "(see Equations 5.90 and 5.91)"
533 *	**4th line from above**: incorrect wording / guidance single relative dam height, $d/h_b = 1$. It can be seen that the value of the discharge coefficient, μ (-), increases with increasing values of both the crest width, B, and slope angle, α "of both the crest width, B, and slope angle, α" has to read: "of the crest width, B, and the inverse of the slope angle, α"

Page No	**Erratum / Correction**
535 *	**Table 5.15, third row**: incorrect indication of flow condition

Vertic	high dam (narrow, rough, porous)	Eq 5.85	1.0	0.9–1.1	subcritical

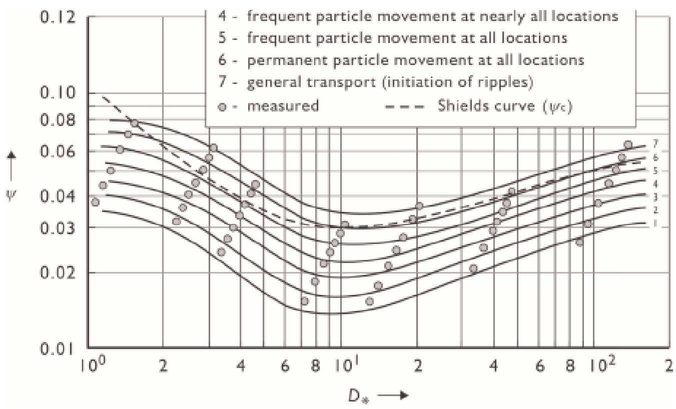
The flow condition (last column) for high dam has to read: “supercritical”, i.s.o. “subcritical”

536 * — **6th line from below:** incorrect wording: ‘time’ to delete

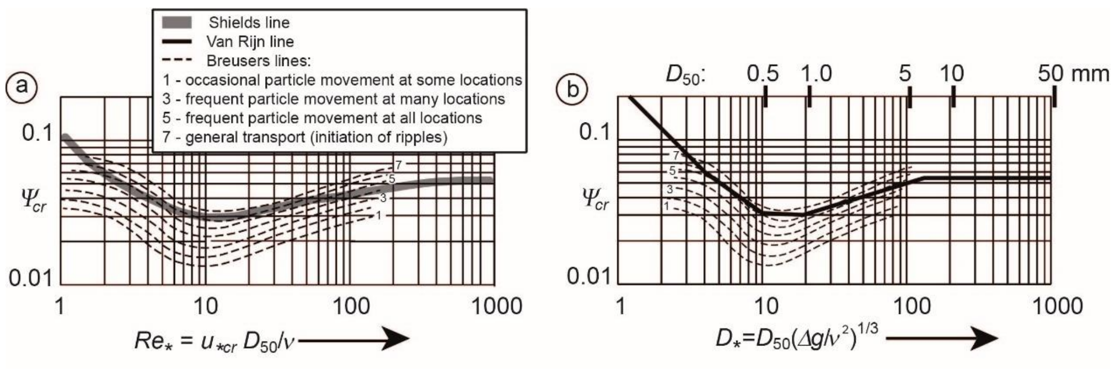
induces submerged weight) and cohesion. Cohesion is only relevant to time sediments in the clay and silt range (D < 5 μm and D < 50 μm, respectively) or fine sand (D < 250 μm) with

“relevant to time sediments” has to read: “relevant to sediments”

545 * — **Figure 5.32;** the Shields curve / figure is incorrect



The correct figures [(a) with the Reynolds number, based on the shear velocity: Re_*; and (b) with the non-dimensional stone diameter, D_*] are as below:

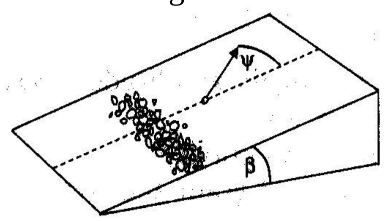


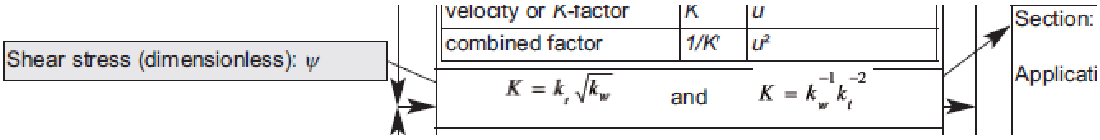
An additional Note to be added below the Figure:

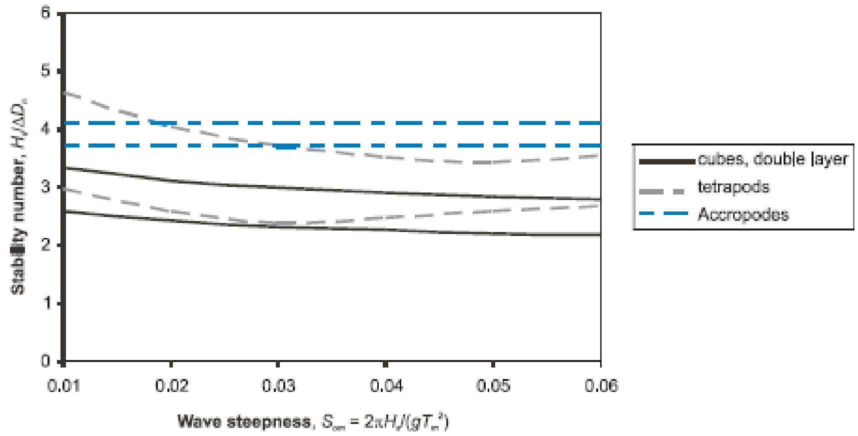
“3 The ratio D_*/D_{50} as used is based on a kinematic fluid viscosity of $\nu = 1.33\ 10^{-6}$ m²/s”

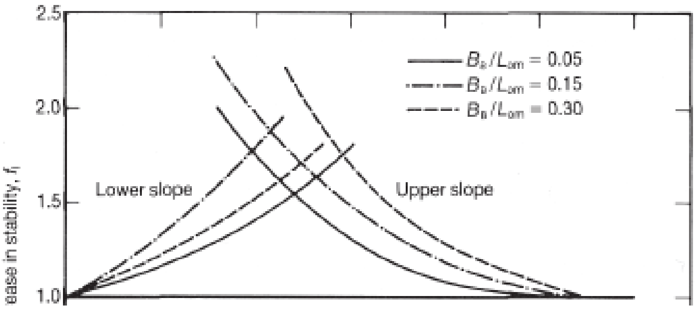
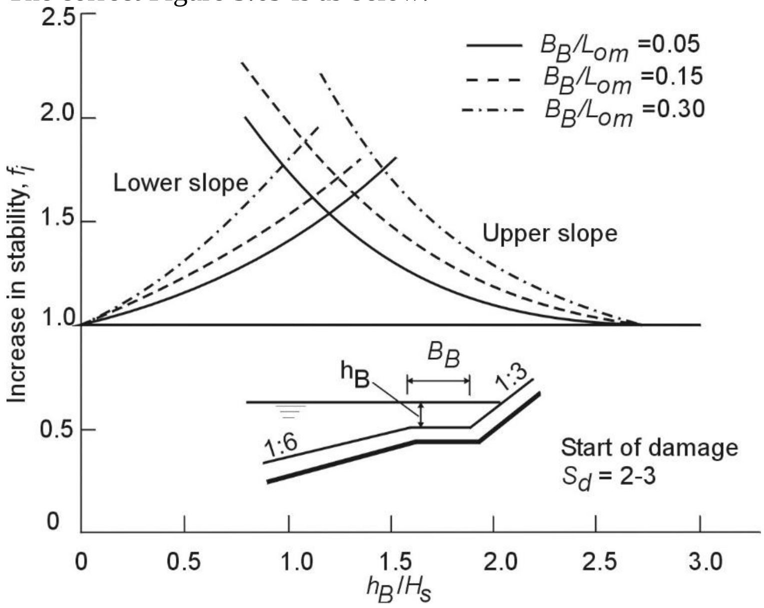
The caption text of this Figure to be modified as follows:

The Shields diagram (figure a – left) and the modified Shields diagram (b) for steady flow

Page No	Erratum / Correction
546	**Equation 5.104:** typing error (power '2' is missing) velocity, U_{cr} (m/s): $\psi_{cr} = \frac{1}{C^2} \cdot \frac{U_{cr}}{\Delta D}$ (5.104) The Equation has to read: $\Psi_{cr} = \frac{1}{C^2} \frac{U_{cr}^2}{\Delta D}$
547 *	**3rd line from above:** incorrect cross reference formulae, where ψ_{cr} is given as a function of a non-dimensional grain size, D_* (-). Equation 5.115 gives the general form of this approximation: $\psi_{cr} = A D_*^B$ (5.105) "Equation 5.115" has to read: "Equation 5.105"
548 *	**1st line below Equation 5.108:** typographical error $\hat{\tau}_w = \frac{1}{2} \rho_w f_w u_o^2$ (5.108) where f_w is the friction factor (-) and u_o is the peak orbital velocity near the bed (m/s²), which "velocity near the bed (m/s²)" has to read: "velocity near the bed (m/s)"
548	**9th line from below**: typographical error Equation 5.117 can be rewritten using $z_0 = k_s/30$ (see Section 4.3.2.4) as Equation 5.111: $f_w = 0.237 \left(\frac{a_o}{k_s} \right)^{-0.52}$ for $a_o > 0.636\, k_s$ (5.111) "Equation 5.117" to read "Equation 5.109"
550	**Figure 5.33**: printing mistake  **Figure 5.33** *Definition of slope angles* The correct Figure is as below: 

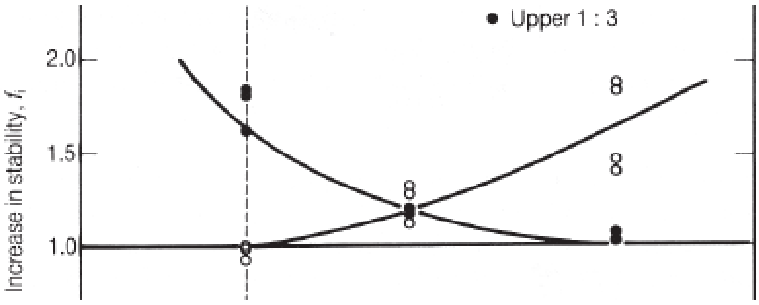
Page No	Erratum / Correction
550 / 551	**Last line and 6th line from below page 550; and 1st line of page 551:** incorrect cross reference prototype. Excessive turbulence levels, eg in excess of r = 10 to 15 per cent, may occur due to particular interactions of flow and structures as listed in Section 4.2.5.8. "Section 4.2.5.8" has to read: "Section 4.3.2.5"
555 *	**Figure 5.34; central part:** typing error: K → K'  "$K = k_w^{-1}\ k_t^{-2}$" → "$K' = k_w^{-1}\ k_t^{-2}$"
576	**Box 5.15:** typographic errors (4th, 6th and 8th line from below) and incomplete guidance Application of the deep-water formula (Equation 5.136), using T_m, will lead in this situation (a 6 h storm, ie N = 6 × 3600/9.5 = 2273) to: D_{n50} = 1.27 m and M_{50} = 5.4 tonnes. Using the shallow water formula (Equation 5.139), with again N = 6× 3600/9.5 = 2273, leads to: $H_s/(\Delta D_{n50})$ = 1.7, which results in a armourstone size of: D_{n50} = 1.4 m and a median mass of : M_{50} = 7.2 tonnes. **Conclusion:** The stability of rock-armoured slopes in **very** shallow water conditions requires special attention; in this example the minimum mass of the armourstone is 30 per cent larger than expected based on the deep-water formula. a) 8th line from below: "D_{n50} = 1.27 m and M_{50} = 5.4 tonnes." → "D_{n50} = 1.25 m and M_{50} = 5.2 tonnes. Applying the same Equation, but then with $H_{2\%}$ instead of H_s and c_{pl} = 8.7 instead of 6.2 (because of the ratio $H_{2\%}/H_s$ = 1.4 for deep water), as proposed by van der Meer (1988b), will lead to: D_{n50} = 1,11 m and M_{50} = 3.6 tonnes." b) 6th line from below: "= 1.7, … : D_{n50} = 1.4 m and a median mass of: M_{50} = 7.2 tonnes." → "1.97, … : D_{n50} = 1.27 and a mass of M_{50} = 5.4 tonnes." c) 3rd and 4th line from below: "is 30 percent larger … deep-water formula." → "is hardly larger … deep-water formula (Equation 5.136), using H_s, and 50 percent larger than expected when using the same Equation, but then with $H_{2\%}$ instead of H_s. The latter is therefore not advised as a safe approach; see also page 574."
577 *	**8th line below Table 5.27:** inconsistent notation, d defined as a function of the depth (via $H = \gamma d$, where d is the water depth (m) and γ is the wave breaking coefficient with an average value of γ = 0.5 and a standard deviation of σ_γ = 0.15). "$H = \gamma d$, where d is the water depth " has to read: "$H = \gamma h$, where h is the water depth "
585	**2nd line above Equation 5.145:** ambiguous guidance y_s = distance to the bank normal to the sailing line (m). This line has to read: y_s = distance between ship's hull and the bank, normal to the sailing line (m).

Page No	Erratum / Correction
594	**Figure 5.47**: typographic error in the label to the y-axis. The stability number of concrete elements refers to $H_s/\Delta D_n$ instead of $H_s/\Delta D_{n50}$ **NOTE**: the Figure below is correct.  Figure 5.47 *Stability number versus fictitious wave steepness based on results of model tests for start of damage and failure limits (N = 1000 waves; side slope 1:1.5)*
598 *	**3rd line from above:** incorrect cross reference For the filter function of underlayers, reference is made to Section 5.4.5.3, where geotechnical filter rules are discussed. For coastal structures modified filter rules are used, as discussed above and in Section 5.2.2.10. "Section 5.4.5.3" has to read: "Section 5.4.3.6"
600	**Equation 5.164:** π not in Italic font $r_D = \left(1.25 - 4.8 \frac{R_c}{H_s} \sqrt{\frac{s_{op}}{2\pi}}\right)^{-1}$ (5.164) Equation has to read: $r_D = \left(1.25 - 4.8 \frac{R_c}{H_s} \sqrt{\frac{s_{op}}{2\mathrm{\pi}}}\right)^{-1}$
617 *	**6th line below Equation 5.185:** incorrect cross reference diminish the hydraulic gradients at the surface of the underlying subsoil (Section 5.2.2.10 and Section 5.4.5.3). In either case it is important that both the subsoil and the stone filling "Section 5.4.5.3" has to read: "Section 5.4.3.6"
618 *	**First line from above: the** gradings are from former armourstone standard NEN 5180 stone to the asphalt grout. If a smaller grading of stone is used (50/150 mm or 80/200 mm), for example as a new layer over an existing revetment, asphalt mastic must be used as the To be consistent with the current standard EN 13383: "(50/150 mm or 80/200 mm)" has to read: "(45/125 mm, 63/180 mm or 90/250 mm)"

Page No	**Erratum / Correction**
618 *	**First line above Figure 5.68:** incorrect cross reference designed for water pressure. For more information on this, reference is made to the *Technical report on the use of asphalt in water defences* (TAW, 2002a). "(TAW, 2002a)" has to read: "(TAW, 2002b)"
618 *	**Line above section 5.2.2.8:** incorrect cross reference revetments can be found in TAW, 2002a. ***5.2.2.8 Stepped and composite slopes*** "TAW, 2002a. " has to read: "TAW, 2002b. "
619	**Figure 5.69:** incorrect line indication for lower slope factor  The correct Figure 5.69 is as below: 

<table>
<tr><th>Page No</th><th>Erratum / Correction</th></tr>
<tr><td>619</td><td>

Figure 5.70: incorrect plots and lines



The correct, revised Figure 5.70 is as below:

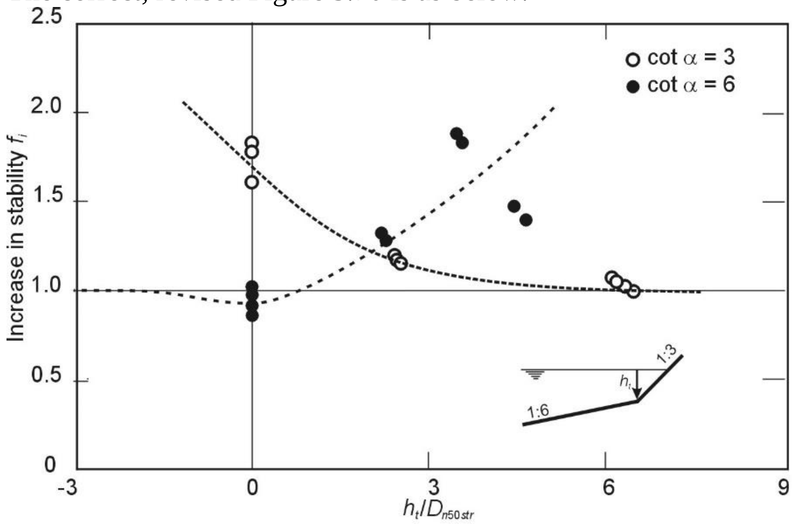


Figure 5.70 ***Stability increase factors, f_i, for composite armourstone slopes***

</td></tr>
<tr><td>620</td><td>

Figure 5.71: incorrect data plots and lines

The upper and the lower figure have been combined in the revised Figure 5.71 below:

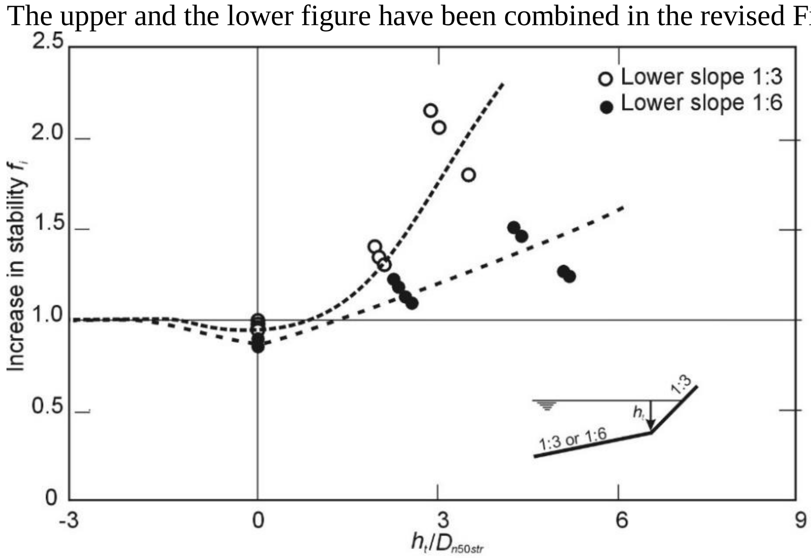


Figure 5.71 ***Stability increase factors, f_i, for armourstone slopes if the upper slope is smooth***

</td></tr>
</table>

Page No	**Erratum / Correction**
623 *	**2nd line below Figure 5.74**: typing error, 0.4 i.s.o. 0.7 **NOTE:** The reader should realise that Equation 5.187 is only based on tests with a h_t/h ratio of 0.7–0.9. **Equation 5.187 should not be extrapolated**. When the water depth becomes more "of 0.7-0.9." has to read: "of 0.4-0.9."
630	**1st line below Equation 5.192:** incorrect cross reference $$\frac{M_{50u}}{M_{50a}} = \frac{1}{15} \text{to} \frac{1}{10} \quad (5.192)$$ This criterion is stricter than the geotechnical filter rules given in Section 5.4.5.3 and gives "Section 5.4.5.3" has to read: "Section 5.4.3.6"
630	**Last line of Section 5.2.2.10:** incorrect cross reference and unclear guidance but allow for the transport of water. A full discussion on filter criteria is given in Section 5.4.5.3, where the various filter criteria for stability are presented. "Section 5.4.5.3 … presented." has to read: "Section 5.4.3.6, where various filter criteria for stability under permanent flow conditions are presented."
632	**Figure 5.79 caption:** explanatory note to be added 0 60 120 180 240 $(U_{1\%}\, T_{m-1,0} / D_{n50})\, ((\cot\alpha_{rear})^{-2.5} (1+10 \exp(-R_{c,\,rear} / H_s)))^{1/6}$ **Figure 5.79** *Damage at rear side as function of the maximum velocity at the rear side of the crest, $u_{1\%}$* Second line of the caption has to read: "*of the crest,* $u_{1\%}$*; the trend line is valid for* $\Delta = 1.65$."
633	**Table 5.48:** typographic error Rear-side slope, (V:H) — 1:4–1:2 Damage level parameter, S_d — 2–3.0 The damage level ranges from 2 to 30. "2-3.0" has to read: "2-30".
639 *	**1st and 2nd line above Figure 5.84:** incorrect notation for wave height For preliminary design with this method, it is recommended to use for the wave height (at the structure toe) $H = H_{99.8\%}$. If no information on the wave height distribution is available, $H_{99.8\%} = 1.8H_s$ can be used as an estimate, (see Section 4.2.4.4). "$H_{99.8\%}$" has to read: "$H_{0.2\%}$" [twice]

Page No	Erratum / Correction
639	**Table 5.50:** incomplete guidance (R_c is unclear, and one range is incorrect)

Table 5.50 *Parameter ranges for method by Pedersen (1996)*

Parameter	Symbol	Range
Breaker parameter using T_m	ξ_m	1.1–4.2
Relative wave height	H_s/R_{ca}	0.5–1.5
Relative run-up level	R_o/R_{ca}	1–2.6
Relative berm width	R_{ca}/B_a	0.3–1
Front side slope	$\cot\alpha$	1.5–3.5

- The range of the relative berm width has to read "0.3–1.1" in stead of "0.3–1".
- An explanatory note to be added below the Table:
  "**Note**: R_c is the elevation of the crown wall above SWL, = R_{ca} + d_{ca}, see Figure 5.83."

640 — **Equation 5.214 vs Figure 5.86**: Incorrect guidance:, B_u is negative

$$R_u/H = A_u\left(1-\exp\left(B_u\xi\right)\right) \qquad (5.214)$$

As B_u in Figure 5.86 is positive, the exponent has to be negative. Equation 5.214 has to read:

$$R_u/H = A_u(1-\exp(-B_u\xi))$$

641 — **Table 5.51:** typographic error, and incorrect guidance

Table 5.51 *Empirical coefficients for calculating pulsating pressures*

B_u/D_{n50}	a	b	c
1	0.446	0.068	259.0
2	0.362	0.069	357.1
3	0.296	0.073	383.1

Note
For values of the run-up parameter, B_u (-), see Figure 5.86.

- "B_u" has to read: "B_a", the berm width in front of the crown wall.
- The note below the Table to be deleted, as this is not applicable.

650 * — **Table 5.53:** ambiguous guidance for turbulence factors for special cases

Turbulence factor, k_t	
	• normal turbulence level: $k_t^2 = 1.0$ • non-uniform flow, increased turbulence in outer bends: $k_t^2 = 1.5$ • non-uniform flow, sharp outer bends: $k_t^2 = 2.0$ • non-uniform flow, special cases: $k_t^2 > 2$ (see Equation 5.226)

Page No	Erratum / Correction
	The text of the 4th bullet has to read: • heavy turbulence; in hydraulic jumps: $k_t^2 = 3$ (see Pilarczyk (1995)) Additional 5th bullet: • extreme turbulence due to screw jets: $k_t^2 > 3$ (see Pilarczyk (1998)) And a Note to be added: "**NOTE**: For evaluation of the stability due to ship-induced propeller jet velocities, the use of Equation 5.226 is advised, as the Pilarczyk formula has not been validated for these loads. "
654 *	**Equation 5.226 and various definitions in text below the equation:** unclear and ambiguous guidance; the turbulence factor is defined different from that in Pilarczyk's formula, and twice the factor '2' gives rise to confusion Equation 5.226: $$\frac{U'^2/2g}{\Delta D_{50}} = 2\frac{k_{sl}}{k_t^2} \quad (5.226)$$ where D_{50} is the median sieve size of the armourstones (m), k_{sl} is the slope factor (-) and k_t is the turbulence factor (-), both factors defined in Section 5.2.1.3. The depth-averaged velocity, U', can be substituted by U_r for return currents and by u_p for propeller jets. Return currents can be calculated with the formulae presented in Section 4.3.4.1. In Equation 5.226, the value k_t^2 = 1.4 to 1.6 can be used for the corresponding turbulence factor, in the case of return currents. **Propeller jet velocities** can be calculated with Equations 4.187 to 4.190 in Section 4.3.4.3. For standard situations in which vessels are not fully loaded and in which the berthing position is not always the same, the value k_t^2 = 5.2 can be used in Equation 5.226. For situations in which the maximum impact of the propeller jet occurs frequently and always at the same place a higher value, k_t^2 = 6, is recommended. The Equation 5.226 and the two lines below the Equation have to read as follows: " $$D_{50} = \beta_{Iz} \frac{U'^2}{2\, g\, k_{sl}\, \Delta}$$ where D_{50} is the characteristic sieve size of the armourstone required (m), k_{sl} is the slope factor (-) as defined in Section 5.2.1.3, and β_{Iz} is the dedicated turbulence / stability factor (-) for this 'Izbash' based Equation. " The wording in the fifth line below the Equation: "the value k_t^2 = 1.4 to 1.6 can " has to read: "the value β_{Iz} = 1.4 has to " The wording in the 8th line below the Equation: "the value k_t^2 = 5.2 can be " has to read: "the value β_{Iz} = 2.6 has to " The wording in the 10th line below the Equation: "higher value, k_t^2 = 6, is recommended" has to read: "higher value, β_{Iz} = 3, is recommended."

Page No	Erratum / Correction
656	**Equation 5.228**: D_{n50} to read D_{50} Equation 5.228 gives the relationship between the required stone sieve size, D_{50} (m), and the relevant hydraulic and structural parameters: $$D_{n50} = 0.7\frac{(r_0 U)^2}{g\Delta\psi_{cr}} \qquad (5.228)$$ The Equation has to read: $D_{50} = 0.7\frac{(r_0\, U)^2}{g\,\Delta\,\psi_{cr}}$
661 *	**1st and 2nd line from below**: typographic errors relationships determine the curve of $H/(\Delta D_{n50})$ versus $h_b/(\Delta D_{n50})$. Instead, one should apply $(h\text{-}h_b)/(\Delta D_{n50})$, which appears to be more or less a constant for varying values of $H_b/(\Delta D_{n50})$ (Figure 5.99). - "$(h\text{-}h_b)/(\Delta D_{n50})$ " has to read: "$(H\text{-}h_b)/(\Delta D_{n50})$ " - "$H_b/(\Delta D_{n50})$ " has to read: "$h_b/(\Delta D_{n50})$ "
705	**5th line from below (line above Equation 5.250):** typing error *actions*, $\sum E_{i;d}$, have to be less than or equal to the corresponding combinations of resistances, $\sum E_{j;d}$: $$\sum_i E_{i;d} \le \sum_j R_{j;d} \qquad (5.250)$$ $\sum E_{j;d}$ has to read: $\sum R_{j;d}$
720	**2nd line above Equation 5.265:** ambiguous guidance A good **geometrically tight** (or **closed**) criterion (Equation 5.265) has been formulated by Kenney and Lau (1985): $$[F_{4D}/F_D - 1]_{min} > 1.3 \qquad (5.265)$$ "A good **geometrically tight** (or **closed**) criterion (Equation 5.265) has been formulated by" has to read: "For **geometrically tight** (or **closed**) granular filters (see below), a good criterion for internal stability is given in Equation 5.265, as formulated by"
720 / 721	**Location of Figure 5.133:** ambiguous guidance Figure 5.133 to be moved from top of page 721 to 17th line from top of page 720 (just before "On the basis of … "), indicated below: the grain size distribution curve. On the basis of Equation 5.265, more practical design rules (Equations 5.266 through 5.269)

Page No	Erratum / Correction
721 *	**Typing error in former corrigendum, of February 2016: 3.3 i.s.o. 0.33** **Line above Equation 5.272**: incorrect guidance, and Notes to be added for better guidance, including a design diagram **geometrically tight** (or **closed**) criterion as given in Equation 5.272 can be applied **if both materials are well-graded (ie without gaps)** and comply with the internal stability criterion, $D_{60}/D_{10} < 10$): $D_{15f}/D_{85b} < 5$ (5.272) As the criterion has been derived for uniform materials (ie $C_U < 3$) and rather thick filter layers, the text of the two lines above Equation 5.272 ["**materials are well-graded (ie without gaps)**-and … , $D_{60}/D_{10} < 10$:"] has to read: "**materials are well graded (ie without gaps) and rather uniform** (ie $D_{60}/D_{10} < 3$):" In addition to this, notes to be added between the Note above Figure 5.134 and that Figure 5.134: "**NOTE:** The criterion given above in Equation 5.272 (ratio < 5, based on the characteristic pore size of $0.2D_{15f}$), has been derived for flow conditions and for rather thick filter layers, ie $t = 5D_{50f}$. In the case of smaller layer thicknesses, that factor should be smaller, up to ~~0.33~~ **3.3** for $t = 2D_{50f}$. Alternatively, model tests could yield the appropriate value. **NOTE:** Design recommendations for the interface stability of (sloped) granular structures **subject to waves** are neither widely known, nor broadly applied, except for the rather strict ratios given in Section 5.2.2.10 for underlayers: Equations 5.192 and 5.193. The following set of criteria, as suggested by Thompson & Shuttler (1975), are given here as guidance to assess the (in)stability of the interface between top layer (indicated with "*f*") and underlayer ("*b*"): • $D_{15f} / D_{85b} \leq 4$ • $D_{50f} / D_{50b} \leq 7$ • $D_{15f} / D_{15b} \leq 7$ **NOTE:** One single, generally applicable criterion for the interface stability of granular structures subject to flow conditions cannot be presented in the form of one formula, as such criterion depends on the grading widths of both the base material and the filter material. In the case of wide graded base material, the criterion given in Equation 5.272 is unsafe, as too many fines are washed out through the filter material. On the other hand, in the case of wide graded filter material (with $C_U > 6$) on uniform base material, the criterion of Equation 5.272 can be relaxed from 5 to 10. It is, therefore, advised to make use of the design diagram of Cistin/Ziems, presented in Heibaum (2004). The allowable ratio D_{50f}/D_{50b} as presented in that diagram (see Figure 5.134a), includes a safety factor $\eta = 1.5$ and covers a wide range of grading widths for both base and filter material.

<table>
<tr><th>Page No</th><th>Erratum / Correction</th></tr>
<tr><td></td><td>

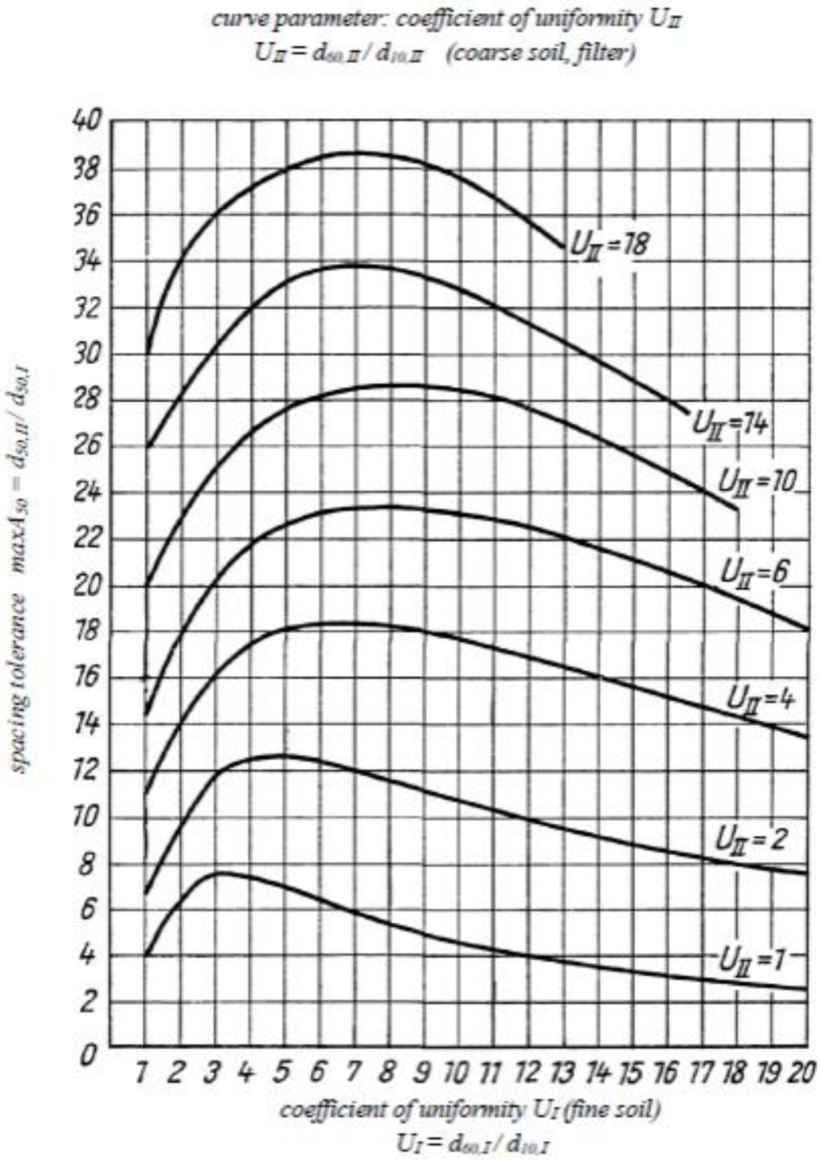
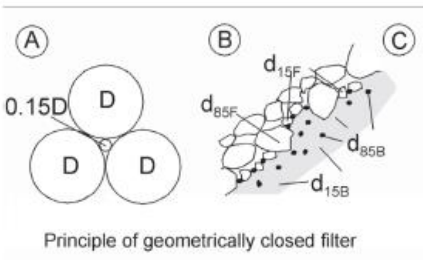


Figure 5.134a: *Filter design chart according to the Cistin/Ziems approach (Heibaum, 2004)* "

</td></tr>
<tr><td>**721**</td><td>

Figure 5.134: ambiguous guidance in part A



The measure of the pores between the particles ("0.15D") has to read: "0.2D". This is then consistent with the guidance on page 719 ("approximately $0.2D_{15}$") and with the criterion given in Equation 5.272.

</td></tr>
</table>

Page No	Erratum / Correction
726 *	**1st line below Equation 5.286**: incomplete definition $i \le \gamma'/\gamma_w$ or $i \le (\gamma - \gamma_w)/\gamma_w$ (5.286) where γ is the the unit weight of the soil (= grains + water) (kN/m³). "the unit weight " has to read: "saturated unit weight"
742	**Equation 5.295:** typographic error: λ, the leakage length, should be in Italic font: λ $\mathrm{\lambda} = \sqrt{t_c t_f k_f / k_c}$ (5.295) where t_f and t_c are the thickness of the filter and cover layer respectively (m); k_f = permeability of the filter The Equation 5.295 has to read: $\lambda = \sqrt{t_c t_f k_f / k_c}$
745 *	**Box 5.38:** typographic errors (4) Substituting this in Equations 5.296 and 5.297, it is found that T_{ph} = 105 s and L_{ph} = 6 m. Consequently: $\frac{T_{ph}}{T} = \left(\frac{B}{L_{ph}}\right)^2 = 25 >> 1$ - T_{ph} = 105 s and L_{ph} = 6 m" → "T_{ph} = 113 000 s and L_{ph} = 19 m" - "25 >> 1" → "2.5 > 1" 1st and 2nd line from below: that the phreatic level inside the dike only varies noticeably in the outer few metres and that the tidal variation will hardly induce any water level variation in the waterway at its rear side. "the tidal variation " has to read: "the effect of the wind waves "
746	**Equation 5.299:** single set of parentheses instead of a double set the maximum internal set-up, $z_{s,max}$ (m), as given in ICE (1988): $\frac{z_{s,max}}{h} = \sqrt{(1 + \delta_w F(B/L_{ph}))} - 1$ (5.299) The Equation has to read: $\frac{z_{s,max}}{h} = \sqrt{1 + \delta_w F(B/L_{ph})} - 1$

Page No	Erratum / Correction
746 *	**2nd line below Equation 5.300**: additional notation (*B*) $$\delta_w = 0.1\frac{cH_s^2}{n_v L_{ph} h \tan\alpha} \quad (5.300)$$ where: h = water depth (m) δ = wave height parameter (-) To be inserted above "*h* = water depth (m): " *B* = structure width at SWL (m) "
746 *	**Note to Figure 5.152:** incomplete guidance, at SWL to add **Note** For open lee side situations maximum set-up is localised at *b·B* (m) from sea side, where the value of *b* (-) can be seen in this figure. **Figure 5.152** *Diagram for internal set-up due to slope* "at *b·B* (m) from sea side, " has to read: "at *b·B* (m) from the sea side at SWL, "
748 *	**1st and 2nd line below Equation 5.304:** typographic error (twice) Also similarly, if the ratio $T_{el}/T = B/L_{el} << 1$, elastic storage is **not** important and the load can be considered as quasi-stationary. If instead, $T_{el}/T = B/L_{el} >> 1$, elastic storage **is** important "$T_{el}/T = B/L_{el}$" has to read: "$T_{el}/T = (B/L_{el})^2$ " [twice]
762	**20th line from below:** an additional reference to be added regression model". Proc *Inst Civ Engrs, Water, Maritime and Energy*, vol 130, Mar Helgason, E and Burcharth H F (2005). "On the use of high-density rock in rubble mound breakwaters". In: *Proc 2nd int coastal symp in Iceland, Hornafjördur, 5–8 Jun*. Icelandic Maritime Administration, Kópavogur Just above "Helgason, E .. ...." to be inserted: "Heibaum, M H (2004). "Geotechnical filters – The important link in scour protection". In: *Proc 2nd Int. Conf on Scour and Erosion (ICSE-2), Singapore, 4-7 Nov*. BAW, Karlsruhe "

Page No	Erratum / Correction
772	**European standards:** ambiguous guidance – not correctly indicated in the version of December 2011 Eurocode 7 – see EN 1997-1:2004 and EN 1997-2 Eurocode 8 – see EN 1998-1:2004 and EN 1998-5:2004 EN 1997-1:2004. Eurocode 7. *Geotechnical design. General rules* EN 1997-2 *Geotechnical design. Ground investigations. Lab testing* EN 1197-2 *Geotechnical design. Ground investigation and testing* • The 1st line to read: "Eurocode 7 – see EN 1997-1:2004 and 1997-2:2007" • The 4th line to read: "EN 1997-2: 2007. Eurocode 7. *Geotechnical design – Part 2: Ground investigation and testing*" • The 5th line to be deleted; it does not exist
852 *	**First line of section 6.3.3.2:** a verb is missing **6.3.3.2 *Physical boundary conditions*** Sections 4.2 and 4.4 the definition of hydraulic and geotechnical physical boundary "Sections 4.2 and 4.4 the" has to read: "Sections 4.2 and 4.4 give the"
892 *	**4th line above subsection 6.4.4.2:** unclear guidance dependent on shear strength and the penetration depth for dumped armourstone appears to scale linearly with the ratio of the penetrator's mass to its cross-sectional area. "for dumped armourstone" has to read "for (intact) rock"
930	**2nd line below Figure 7.7:** typographic error (M i.s.o. M_{50}) The stability of clay-filled bags in tidal currents can be checked. Since ρ = 1500 kg/m³ and M = 50 kg, the nominal diameter of the layer of bags is: $D_n = (M_{50}/\rho)^{1/3}$ (see Section 3.4.2) = "$D_n = (M_{50}/\rho)^{1/3}$ " has to read: "$D_n = (M/\rho)^{1/3}$ "
1008 *	**Last line of Box 8.1**: incorrect wording • if it did and the apron did not function, no serious consequences were to be expected. This last line has to read: " • If the apron would fail, the consequences would not be serious."

Page No	**Erratum / Correction**
1008 *	**Third line from below**: incorrect wording When it is necessary to replenish a falling apron, the extra volume of armourstone should be dumped on the horizontal part of the apron. The settling mechanism can then distribute the stones over the slope. "the extra volume of " has to read: "an extra volume of"
1009	**Box 8.2:** incorrect cross reference, typing errors, and incorrect guidance. 1. **15th line from below:** typing error **When designing a falling apron, the following aspects should be considered. As the apron will finally be formed in the model, it will be of a single armourstone layer on a steep slope 1:2. It should first of all be checked whether the armourstone size (D_{n50} = 0.20 m in the prototype) is large enough on this steep** "D_{n50} = 0.20 m " has to read: "D_{n50} = 0.25 m " 2. **10th line from below:** incorrect cross reference **= 0.7. The appropriate size of the armourstone required for stability against current velocities up to U = 3 m/s can be evaluated using the Pylarczyk formula, Equation 5.119 (Section 5.2.3). Values used for the** "Equation 5.119" has to read: "Equation 5.219" 3. **Text of 9th line from below until last line of Box**: many (typing) errors and incorrect, ambiguous guidance **various factors and parameters are: mobility parameter, ψ = 0.035; relative buoyant density of the stones, Δ = 1.65; stability factor, Φ_{sc} = 0.75; velocity profile factor (for h = 30 m), k_h = 0.68; and turbulence factor, k_t^2 = 1.0 (ie normal turbulence level). The armourstone size required is: D_{n50} = 0.19 m, with a corresponding mass of M_{50} = 20 kg. An armourstone grading of 5–40 kg (D_{n50} = 0.22 m) is appropriate. A wide grading is intentionally selected to limit loss of fines from the underlying material, since a granular filter layer or geotextile under the apron is missing. An expected scour of 6 m implies a minimum volume of armourstone in the apron of 0.22 × 6.0 × √5 = 2.96 m³ per linear metre of revetment. The apron should be placed at a water depth of 15 m, necessitating high placement tolerances. The behaviour cannot be predicted in detail when a volume of 6 m³ per linear metre of revetment is placed.** Text of these 9 lines to be replaced by: "various factors and parameters are: mobility parameter, ψ_{cr} = 0.035; relative submerged density of the stones, Δ = 1.65; stability factor, Φ_{sc} = 0.75; velocity profile factor (for h = 20 m), k_h = 0.3; and turbulence factor, k_t^2 = 2 (ie increased turbulence in outer bend). The armourstone size required is: D_{n50} = 0.18 m, with a corresponding mass of M_{50} = 15 kg. An armourstone grading of 5-40 kg ($D_{n50\text{-}av}$ = 0.20 m) would suffice. A wide grading (1-100 kg) has, however, intentionally been selected to limit loss of fines from the underlying material, since a granular filter layer or geotextile under the apron is missing. An expected scour of maximum 12 m (see Figure 8.28) would require a minimum volume of armourstone (with D_{n50} = 0.25 m) of 12 x √5 x 0.25 = 6 to 7 m^3 per linear metre of revetment, assuming that a single armourstone layer is formed in accordance with the model tests. The apron is to be placed in water depths of maximum 28 m (at PWD -15 m, see Figure 8.28), necessitating high placement tolerances. In practice, the volume of armourstone placed was therefore far more, up to 40 m^3 per linear metre."

Page No | **Erratum / Correction**

1011

Additional item to be inserted after the 2nd bulleted item, " • for side slopes of ...."

Armourstone sizing against wave attack

The dimensioning of the upper part of the revetment against wave attack may be per using the design method presented in Section 5.2.2:

- for a straight slope of a non-overtopped structure, see Section 5.2.2.2
- for side slopes of low-crested structures, see Section 5.2.2.4
- for crest and rear-side of marginally overtopped structures, see Section 5.2.2.11.

Additional item (as in original text of the 2007 edition) as 3rd bullet:

- "for a composite slope, ie with a berm, refer to Section 5.2.2.8"

1012

Box 8.3 – 2nd line from below: typographic error and **last line**: incorrect wording

A standard double layer thickness is $2k_t D_{n50}$ (see Section 3.5.1 for values of the layer thickness coefficient, k_t (-)). When small armourstone is required for weak currents, it may be practical to use a thicker layer to sink a geotextile and a fascine mattress. Conversely, assuming a minimum thickness of 0.5 m is required for construction purposes, ie D_{n50} = 0.203 m, the hydraulic stability for this armourstone size may be checked to confirm if sufficient.

1. "D_{n50} = 0.203 m" has to read: "D_{n50} = 0.28 m for k_t = 0.90"
2. "to confirm if sufficient" to read: "to confirm that this size is sufficient."

1033 *

Last line of the page / box 8.5: incorrect figures for return current and wave height; see also errata in Table 8.6, given hereafter

The hydraulic loads after design are summarised in Table 8.6. The design parameters are thus the maximum return current and the maximum wave height (see Table 8.6) where selected values for $\hat{U}_r$ and H_i are respectively 1.98 m/s and 0.60 m (see highlighted values in Table 8.6).

"selected values for $\hat{U}_r$ and H_i are respectively 1.98 m/s and 0.60 m" has to read:
"selected values for $\hat{U}_r$ and H_i are 0.87 m/s and 0.52 m respectively"

1034 *

Table 8.6 in Box 8.5: all calculation results are incorrect

Box 8.5 *Example of typical results from a calculation procedure for slope protection due to ship-induced waves (contd)*

Table 8.6 *Main results of calculation*

	Parameter and symbol	Ship A	Ship B
Step 1	Maximum ship speed, V_L	7.27 m/s	7.75 m/s
Step 2	Sailing speed, V_s	V_s = 0.60 V_L = 4.36 m/s	V_s = 0.70 V_L = 5.42 m/s

Page No	Erratum / Correction
	The correct figures for the two ships A and B are given below:

Box 8.5 *Example of typical results from a calculation procedure for slope protection due to ship-induced waves (contd)*

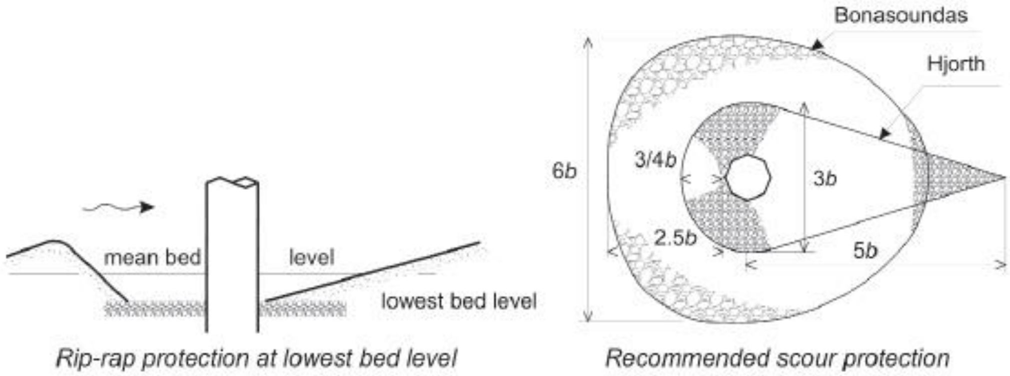
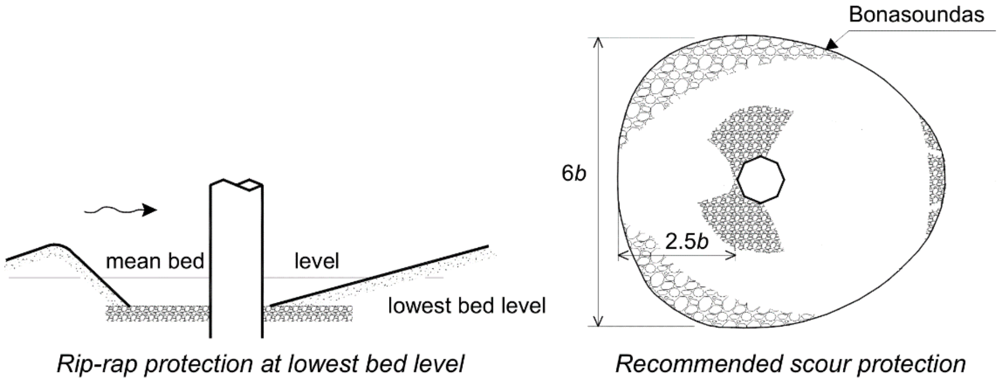
Table 8.6 *Main results of calculation*

	Parameter and symbol	Ship A		Ship B	
Step 1	Maximum ship speed, V_L	5.12 m/s		6.35 m/s	
Step 2	Sailing speed, V_s	$V_s = 0.75V_L = 3.84$ m/s		$V_s = 0.75V_L = 4.77$ m/s	
Step 3	Mean water level depression, Δh	0.39 m		0.35 m	
	Mean return velocity, U_r	0.68 m/s		0.43 m/s	
Step 4	Position relative to axis, y	y = 0	y = 30 m	y = 0	y = 30 m
	Max. water level depression, $\Delta\hat{h}$	0.39 m	0.62 m	0.35 m	0.76 m
	Max. return flow, $\hat{U}_r$	0.68 m/s	0.87 m/s	0.43 m/s	0.79 m/s
	Front wave, Δh_f	0.43 m	0.66 m	0.39 m	0.80 m
	Stern wave, z_{max}	0.59 m	0.93 m	0.53 m	1.14 m
	Secondary wave, H_i	0.18 m	0.24 m	0.41 m	0.52 m

1050 — **7th, 8th and 11th line from above:** typing errors ($M_{50} \rightarrow D_{50}$ and $2b \rightarrow 2D_{n50}$) and ambiguous guidance

- local velocity at the scour protection can be estimated to $v_s \approx 2U$, where v_s is the velocity at the scour (m/s) and U is the depth averaged flow velocity (m/s) (LCPC, 1989)
- median stone size can be estimated as $M_{50} \approx (4/25)U^2$
- minimum extension of protection can be estimated as $2b$ *to* $3b$ from the edges of the pier, each side
- thickness of the protection can be estimated to $2{\cdot}b$.

- 1st bullet: the reference "(LCPC, 1989)" to be deleted.
- 2nd bullet: "median" to be deleted and " as $M_{50} \approx (4/25)U^2$" has to read: ", based on the Izbash formula (Equation 5.120), as: $D_{50} = 1.4\ (2U)^2/(2g\Delta) \cong (4/25)U^2$"
- 4th bullet: "estimated to $2{\cdot}b$." has to read: "estimated to be minimal: $2D_{n50}$."

Page No	Erratum / Correction
1051	**Figure 8.51:** incorrect guidance as for the Hjort method; that method to be deleted  *Rip-rap protection at lowest bed level* *Recommended scour protection* **Notes** Bonasoundas (1973) and Hjorth (1975)are given for further reference. *b* = pier diameter **Figure 8.51** *Example of scour protection of a bridge pier* - The first Note has to read: "Bonasoundas (1973) is given for further reference" - The Figure 8.51 has to be replaced by the Figure below:  *Rip-rap protection at lowest bed level* *Recommended scour protection*
1064	**References Hjort (1975) and LCPC (1989):** to be deleted ~~Hjorth, P (1975). *Studies on the nature of local scour*. Bulletin Series A, No. 46, 1975. Dept. Water Resources Engineering, Lund Institute of Technology, University of Lund, Sweden~~ ~~LCPC (1989). *Les enrochements*. Ministère de l'Equipement, Paris, 106 pp~~
1103 *	**5th line from above**: incorrect guidance waves do not exceed a height of H_s = 1–1.5 m, roughly corresponding with wind force six on the Beaufort scale, whereas under **swell conditions** wave heights beyond H_s = 0.5 m can "with wind force six on the" has to read: "with wind force five on open sea on the "

Page No	Erratum / Correction
1107 *	**5th line from below**: ambiguous / incorrect guidance; as average thickness may only be applicable for heavy gradings, a better guidance is minimum thickness For slope protection and breakwater construction the average thickness of the armour layer, which is usually a double layer, is designed as $2k_t D_{n50}$, both below and above water. Typical “the average thickness of” has to read: “the minimum thickness of “
1108 *	**6th line from above**: incorrect guidance; model testing is normally with thickness of at least two times the nominal size and overtopping. The formulae used to calculate these hydraulic properties are largely based on model testing with two layers of armourstone, which rarely if ever reach $2D_{n50}$. “, which rarely if ever reach $2D_{n50}$.” has to read: “ with a thickness that rarely if ever is less than $2D_{n50}$.”
1122 *	**7th line from above**: additional guidance example, if the return period of an extreme event is five years and the construction period is also five years then there is a probability of 67 per cent $(1 - (1 - 0.2)^5)$ that this event will occur during the construction period (see also Table 2.4 in Section 2.3.3.2). “67 per cent $(1 – (1 – 0.2)^5)$ that this” has to read: “67 per cent (= $1 – (1 – 0.2)^5$; see Equation 4.116) that this”
1142 *	**13th line from above**: unclear guidance For floating equipment, the water depth and the exposure to swell and/or waves and currents are important factors affecting overall downtime during construction. “to swell and/or waves” has to read: “to swell and/or wind-sea waves”
1146 *	**8th line**: unclear (incorrect) guidance The breakwater slope should be properly profiled and, to facilitate placement, the median mass of the armourstone in the underlayer should not exceed 15 per cent of the armour unit mass (see Table 5.36 for details and see Section 5.4 for further discussion on filter “the median mass of the armourstone” has to read: “the M_{50} value of the armourstone”
1187 *	**5th line from above**: incorrect wording **Repair** implies that damage has occurred and structure functionality is significantly reduced. Rebuilding a slumped armoured slope, resetting breakwater crown blocks and backfilling eroded fill could be considered structure repair. Repair can also be thought of as corrective “eroded fill” has to read: “eroded spots”