

## 18<sup>th</sup> Edition Errata

Page 38	Last para., 2 <sup>nd</sup> line, change “table 2.1” to “table 2.2”	Page 216	Add the UN reference “UN Recommendations on the Transport of Dangerous Goods. Manual of Tests and Criteria (Fourth revised ed.), New York and Geneva: United Nations, 2002, ST/SG/AC.10/11/Rev.4.
Page 68	2 <sup>nd</sup> para., 3 <sup>rd</sup> line change “6.4” to “6.3”	Page 225	Under “Velocity of Detonation” 2 <sup>nd</sup> line change “6.6” to “12.8”
Page 92	In example 7.1, 1 <sup>st</sup> line change “blasting” to “crushing” and switch “102,108 microns” and “400,050 microns”	Page 238	Figure 12.13 caption change “figure 7.2” to “figures 7.1 and 7.3a”
Page 93	4 <sup>th</sup> para., 1 <sup>st</sup> line change “Figure 7.6” to “Figure 7.5”	Page 245	1 <sup>st</sup> full para., 3 <sup>rd</sup> line change temperature reference to “20°C (68°F)”
Page 130	3 <sup>rd</sup> para., change “6.2%” to “approximately 12%” and “2.7%” to “only about 3%”	Page 246	Figure 12.22 caption change “7.3” to “7.3b”
Page 154	1 <sup>st</sup> para., 1 <sup>st</sup> line, change “9.27” to “9.26” 1 <sup>st</sup> para., 3 <sup>rd</sup> line, change the second “9.24” to “9.25” In figure 9.23, change “table 9.1” to “table 9.3”	Page 254	Figure 12.28 caption change “8.5” to “9.5”
Page 171	Last para., 2 <sup>nd</sup> and 3 <sup>rd</sup> line change “in the Introduction” to “located in chapter 1 in the section <i>Planning and Design.</i> ”	Page 257	Figure 12.30 caption change “12.6” to “20.6”
Page 172	1 <sup>st</sup> para., change “10.3” to “10.4”	Page 261	2 <sup>nd</sup> para., 1 <sup>st</sup> line change “12.35” to “12.34”
Page 186	3 <sup>rd</sup> full para., last line change “11.2” to “11.3”	Page 281	2 <sup>nd</sup> para., 6 <sup>th</sup> and 7 <sup>th</sup> lines change “6,500 meters/second to 7,644 meters/second (5,375 feet/second to 6,255 feet/second)” to “6,500 feet/second (1,981 meters/second)”
Page 188	Under “Molecular Weight of Compound” equation change the first “=” to a “+”	Page 283	2 <sup>nd</sup> para., 4 <sup>th</sup> line change “13.11” to “13.10”
Page 196	In table 11.5, in the 2 <sup>nd</sup> column, 2 <sup>nd</sup> row change “.40 x 1” to “.40 x .7”	Page 284	1 <sup>st</sup> para., 9 <sup>th</sup> line change “13.12” to “13.14”
Page 198	After equation 11.2 change the second “ABS <sub>e</sub> ” to “ABS <sub>ANFO</sub> ”	Page 291	Figure 13.24 caption change “13.20” to “12.2”
Page 199	In the equation, change “980” to “920” and “728” to “748”, in the following step change “RVS <sub>e</sub> ” to “RBS <sub>e</sub> ”	Page 303	Figure 13.30 caption change “16.18” to “16.10”
Page 201	2 <sup>nd</sup> para., 5 <sup>th</sup> line change “21,500” to “19,685” and “26,200” to “26,250” 3 <sup>rd</sup> para., 2 <sup>nd</sup> line change “1/4” to “1/4”	Page 308	1 <sup>st</sup> para., 11 <sup>th</sup> line, change “7.5” to “7.05”
Page 206	Under “Oxygen Balance” 1 <sup>st</sup> para., 3 <sup>rd</sup> line lowercase “ammonium nitrate” and change “NH <sub>3</sub> ” to NH <sub>4</sub> ” 5 <sup>th</sup> line in the stoichiometric balancing equation add a right facing arrow “→” between “NH <sub>3</sub> NO <sub>3</sub> ” and “CO <sub>2</sub> ” and change the “NH <sub>3</sub> NO <sub>3</sub> ” to “NH <sub>4</sub> NO <sub>3</sub> ”	Page 309	Table 13.7 4 <sup>th</sup> row, 4 <sup>th</sup> column, change “0.140” to “0.126” 5 <sup>th</sup> row, 5 <sup>th</sup> column change “140” to “104” 6 <sup>th</sup> row, 6 <sup>th</sup> column change “240” to “250” Delete 12 <sup>th</sup> row 14 <sup>th</sup> row, 4 <sup>th</sup> column change “0.179” to “0.170” 18 <sup>th</sup> row, 5 <sup>th</sup> column change “100” to “109”, 6 <sup>th</sup> column change “220” to “240” 20 <sup>th</sup> row, 3 <sup>rd</sup> column change “4.8.26” to “4.450”, 4 <sup>th</sup> column change “0.190” to “0.175”, 5 <sup>th</sup> column change “91” to “113”, 6 <sup>th</sup> column change “200” to “250”
Page 208	1 <sup>st</sup> para., 7 <sup>th</sup> line change “1/4” to “1/4” Under “Sensitivity”, lines 9 and 10 switch “detonation” and “deflagration”		

## 18<sup>th</sup> Edition Errata

	25 <sup>th</sup> row, 6 <sup>th</sup> column change “232” to “220”	Page 382	Add “Lilly Explosives Company. 1992. Efficient Blast Management. Charleston, WV.” to references after “Konya”
	26 <sup>th</sup> row, 1 <sup>st</sup> column change “10.5” to “10.6”		Add “Rustan, A. 1998. Rock Blasting terms and symbols. Taylor and Francis, Inc., Rotterdam.” to references
Page 329	27 <sup>th</sup> row, 1 <sup>st</sup> column change “105” to “10.6”		
	2 <sup>nd</sup> para., 1 <sup>st</sup> line change “13 meters/second (40 feet/second)” to “40 seconds/foot (131 seconds/meter).”	Page 397	3 <sup>rd</sup> para., 1 <sup>st</sup> line change “15.5” to “15.10”
Page 335	3 <sup>rd</sup> para., 5 <sup>th</sup> line change “missed” to “misfired”	Page 400	Step 3 change “15.10” to “15.11”
Page 347	Example 14.2, change “centimeters <sup>3</sup> to meters <sup>3</sup> ” to “kilograms to metric tons,”	Page 403	1 <sup>st</sup> para., 1 <sup>st</sup> line change “15.6” to “15.11”
	Example 14.3, omit “(m <sup>3</sup> )” in the equation	Page 404	2 <sup>nd</sup> para., 6 <sup>th</sup> line change “15.6” to “15.11”
	Example 14.4, delete all three “(lbs)” subscripts	Page 405	Step 3, change “15.12” to “15.14” and change all three “Range <sub>max</sub> ” to “Clearance Dist”
Page 353	In the “Caution” box change “14.2” to “14.3”	Page 406	1 <sup>st</sup> para., 1 <sup>st</sup> line change “maximum range” to “clearance distance”
Page 360	Last sentence insert “, or equal to,” between “than” and “8”	Page 455	Figure 15.5 caption, change “15.13” to “15.15”
Page 361	In Figure 14.23, change both references of “d <sub>c</sub> ” to “d <sub>e</sub> ”	Page 460	After 3 <sup>rd</sup> para. “Noise Control” insert new paragraph: “See tables 18.26 and 18.27 on page 460 for Dust Control and Noise Abatement features.”
	Last sentence, change “14.25” to “14.23”	Page 468	4 <sup>th</sup> para., 2 <sup>nd</sup> line change “36” to “35”
Page 362	Example 14.6, change “14.25” to “14.23”	Page 478	Under “Preloading Checks” 2 <sup>nd</sup> line change “the Introduction” to “chapter 17”
	Example 14.6, Step 2 change both “14.25” to “14.23”	Page 485	Last para. 2 <sup>nd</sup> line change “Chapter 5” to “chapter 12”
Page 363	Last para., 2 <sup>nd</sup> line change “14.24” to “14.25”	Page 486	1 <sup>st</sup> para., 4 <sup>th</sup> line change “chapter 11” to “subsequent chapters”
Page 371	1 <sup>st</sup> para., 6 <sup>th</sup> line change “14.5 or 14.6” to “14.4 or 14.5”	Page 493	3 <sup>rd</sup> para., 2 <sup>nd</sup> line change “Chapter 11” to “the following chapters.”
Page 373	Example 14.7, change “400” to “88” and “5.0 centimeter (500 millimeter)” to “102 millimeter”, replace “ $R_c=(400/500)^2$ ” with “ $R_c=(88/102)^2$ ”, change “ $R_c=0.64$ ” to “ $R_c=0.744$ ”, in solution sentence change “0.64” to “0.744” and “change “64%” to “74.4%”	Page 495	Figure 20.2 caption change “Reverse mount Overhead” to “Front Over-Cab Discharge”
	Change Table 14.8 reference from “(Courtesy: M. Karfakis)” to “(Courtesy: Lilly Explosives Company, 1992)”	Page 497	2 <sup>nd</sup> para., change “10.7” to “20.7”
Page 376	Equation 14.8, line “O” change “H” to “H <sub>b</sub> ”, line “H” change “H” to H <sub>b</sub> ” and change “Borehole depth” to “Bench height”, line “D” change “H” to “H <sub>b</sub> ”, line “I” change “H” to “H <sub>b</sub> ”	Page 499	3 <sup>rd</sup> para., 6 <sup>th</sup> line change “5” to “.89” and change “1.3” to “1.34”
Page 379		Page 512	After the last para., insert, “An equipment capability analysis is further described in table 20.5.”
		Page 513	Figure 20.15 change “900” to “90”
			Replace opening sentence with “Pneumatic ANFO loaders offer the blaster the ability to load ANFO into small to medium diameter horizontal and “upholes” with the benefits of an acceptable loading rate and increased loaded density. The loading density of ANFO is

## 18<sup>th</sup> Edition Errata

- increased over that realized by gravity loading. Care must be taken to operate these systems within their recommended operating pressure range."
- Page 514 1<sup>st</sup> para., lines 13-15 change "11.3 kilograms to 22.7 kilograms/minute (25 pounds to 50 pounds/minute)" to "5.6 kilograms/minute to 11.4 kilograms/minute (12.35 pounds/minute to 25.13 pounds/minute)"  
Delete 2<sup>nd</sup> and 3<sup>rd</sup> para.  
Last para., lines 5-7 change "25 kilograms to 35 kilograms/minute (50 pounds to 75 pounds/minute)" to "11.3 kilograms/minute to 16 kilograms/minute (25 pounds/minute to 35.27 pounds/minute),"
- Page 515 Delete 1<sup>st</sup> full para.  
Move Figure 21.4 and previous para., to follow Table 21.2 on page 517
- Page 527 Last para., 6<sup>th</sup> line change "(305)" to "(328)"
- Page 536 1<sup>st</sup> para., last line add the sentence "Table 24.4 below shows the advantages of these pumps."
- Page 537 Equation 24.1 variables add "(inches)" after "Lay flat width" and change "(mils)" to "(inches)" in the next line
- Page 542 4<sup>th</sup> para. 3<sup>rd</sup> line change "7" to "13"
- Page 586 Replace figure 26.15 with air overpressure measured in psi
- Page 587 2<sup>nd</sup> para., 1<sup>st</sup> line change "2/3" to "1/3"
- Page 607 Example 26.17 change in the text "example 26.16." to "equation from figure 26.23."  
Table 26.12 change "26.7" to "26.6"
- Page 608 2<sup>nd</sup> para., 2<sup>nd</sup> line change "Table 26.1" to "table 26.3"
- Page 609 Example 26.19 change "using equations of figure 26.23." to "using equation 26.6a", Example 26.20 change "26.7a" to "26.6a"
- Page 632 1<sup>st</sup> para., 4<sup>th</sup> lines change "chapter 3" to "chapter 30"  
1<sup>st</sup> para., 6<sup>th</sup> line change "Chapter 23" to "chapter 29"
- Page 691 1<sup>st</sup> para., 3<sup>rd</sup> line change "chapter 18" to "chapters 1 and 10"  
1<sup>st</sup> para., 4<sup>th</sup> line change "chapter 21" to "chapters 16 and 32"
- Page 733-736 Add references:
- Kemeny, J., Henwood, J., & Turner, K. (2006). The Use of Ground-based LIDAR for Geotechnical Aspects of Highway Projects. *57th Annual Highway Geology Symposium*, (p. 161).
- McKenzie, C., & Holley, K. (2004). A Study of Damage Profiles Behind Blasts. *Proceedings of the 30th Annual Conference on Explosives and Blasting Technique* (pp. 203-214). Cleveland: ISEE.
- MDL. 2009. MDL LaserAce® Pocket Series Manual.
- Moser, P., Ganster, M., & Gaich, A. (2007). Experience with and Benefits from the use of 3D Stereophotogrammetry for Blast Design and Control. *Proceedings of the 33rd Annual Conference on Explosives and Blasting Technique* (pp. 315-327). Cleveland: ISEE.
- Persson, P. A., Holmberg, R., & Lee, J. (1994). *Rock Blasting and Explosives Engineering*. CRC Press.
- Tsoutrelis, C., Kapenis, A., & Theophili, C. (1995). Determination of Blast Induced Damaged Zones in Pillars by Seismic Imaging. *Explo 95 Conference* (pp. 387-393). AusIMM.
- Yang, R.L., P. Rocque, P. Katsabanis, and W.F. Bawden, 1994 Measurement and analysis of near-field blast vibration and damage, *Geotechnical and Geological Engineering*, 12, 169-182.
- Page 737 1<sup>st</sup> para., 6<sup>th</sup> line change "Surface Mining, 1990" to "Kennedy, 1990"
- Page 743 3<sup>rd</sup> para., 2<sup>nd</sup> line change "2007" to "1997"
- Page 758 Figure 33.28 caption change "Skelly and Loy, 1976" to "Kuiczak, 1979"

## 18<sup>th</sup> Edition Errata

Page 770	Figure 33.40, replace with new timing figure, change caption to "Center opening three-row pattern using fast timing, 9 ms delay from POI to selected wall row and successive boreholes and a 25 ms delay interval between charges within each hole."	Table F.1 caption, change "figure" to "table" for the 17 <sup>th</sup> ed. reference
		Table F.2 caption change "figure" to "table" for the 17 <sup>th</sup> ed. Reference
Page 780	Add "Chung 1982" reference, "Chung, C.S., Computerized sinking cut design in open pit mining, 14th Canadian Rock Mechanics Symposium, Vancouver, 1982."	Step 2, 3 <sup>rd</sup> solution line change "40.1" to "3.96"
Page 813	3 <sup>rd</sup> para., 5 <sup>th</sup> line change "34.21" to "34.22"	Step 2, 4 <sup>th</sup> solution line change "40.1" to "3.96"
Page 814	Equation 34.3 variable definitions line "N" change "34.16" to "34.24"	In figure F.4 caption, change "16.18" to "16.10"
Page 815	Example 34.4, Step 1 change "34.23" to "34.24"	In figure F.5 caption, change "16.18" to "16.10"
Page 820	In the "d <sub>c</sub> " variable line change "(meters) (feet)" to "(centimeters) (inches)"	In figure F.6 caption, change "16.18" to "16.10"
Page 826	Figure 34.26 the labels "Presplit borehole" and "Presplit Explosive" are switched	In figure F.7 caption, change "16.18" to "16.10"
Page 831	Final para., 1 <sup>st</sup> line change "23.32" to "34.32"	In example F.3, change "12-foot" to "10-foot"
Page 840	Last para., change "37" to "36"	In example F.3, change "detonators" to "delay" detonators"
Page 844	Figure 35.5 caption, change "25.1" to "25.7"	In Step 3, 2 <sup>nd</sup> solution line change "0.074" to "0.0794"
Page 848	Figure 35.11 caption, change "29.7" to "25.28b"	In Step 3, 3 <sup>rd</sup> solution line change "0.09" to "0.114"
Page 850	Figure 35.13 caption, change "35.4" to "29.1"	In Step 3, solution statement change "0.09" to "0.114"
Page 853	Figure 35.19 on y-axis; change 2.0 to 0.2; 4.0 to 0.4; 6.0 to 0.6 and 8.0 to 0.8	In example F.4, change "30-gauge" to "20-gauge"
Page 856	Figure 35.25 caption, change "25.28a" to "29.21"	1 <sup>st</sup> para, 2 <sup>nd</sup> line change "30-gauge" to "20-gauge"
Page 868	1 <sup>st</sup> para., 4 <sup>th</sup> line change "35.46" to "35.44"	In table F.6, 1 <sup>st</sup> column 1 <sup>st</sup> row change "F.16" to "F.12"
Page 878	Table 36.6, 2 <sup>nd</sup> column 1 <sup>st</sup> row change "4" to "3"	Page 977 Last para., 6 <sup>th</sup> line change "F.12" to "F.11"
Page 881	2 <sup>nd</sup> para., 2 <sup>nd</sup> line change "0.05" to "0.04", change "1.1" to "0.25"	Page 978 In table F.7, 2 <sup>nd</sup> row change "F.16" to "F.13"
Page 883	Last para., 6 <sup>th</sup> line change "36.8" to "36.13"	In figure F.11, add "TOTAL NUMBER OF 2-OHM ELECTRIC DETONATORS" along x-axis
Page 898	1 <sup>st</sup> para., 2 <sup>nd</sup> line change "(0.7 pounds/yard <sup>3</sup> )" to "(0.51 pounds/yard <sup>3</sup> )"	In table F.8, 1 <sup>st</sup> bullet change "F.16" to "F.13"
	1 <sup>st</sup> para., 3 <sup>rd</sup> line change "(2 pounds/yard <sup>3</sup> )" to "(1.52 pounds/yard <sup>3</sup> )"	In table F.8, 3 <sup>rd</sup> bullet change "F.12" to "F.11"
Page 962	Change Equation F.3 to $R=V/I$	Page 979 In example F.6, 1 <sup>st</sup> line change "F.12" to "F.11"
		Page 980 Step 3, 2 <sup>nd</sup> line change "F.1" to F.2"
		Step 5, 2 <sup>nd</sup> line change "F.12" to "F.11"
		In example F.7, Step 1 change "F.15" to "F.13"
		Page 981 Step 4, 2 <sup>nd</sup> solution line change "580" to "500"
		Step 4, 3 <sup>rd</sup> solution line change "48.3" to "41.6"

18<sup>th</sup> Edition Errata

	Step 4, final solution statement change “48.3” to “41.6”		In table F.14 title, change “F.12” to F.13”
	Step 4, final solution statement change “49” to “42”		In table F.14, 3 <sup>rd</sup> column heading row change “F.11” to “F.7”
	Step 4, final solution statement change “48” to “42”		In table F.14 caption, change “F.12” to “F.13”
	Step 5, 2 <sup>nd</sup> solution line change “49” to “42”	Page 997	In table F.15 title, change “F.12” to “F.13”
	Step 5, 3 <sup>rd</sup> solution line change “113.7” to “97.4”		In table F.15 caption, change “F.12” to “F.13”
	Step 5, final solution statement change “113.7” to “97.4”	Page 999	In the “Caution” box change “F.14” to “F.15”
Page 982	In example F.8, 3 <sup>rd</sup> line change “F.12” to “F.11”	Page 1000	2 <sup>nd</sup> para., 2 <sup>nd</sup> line delete “outlined in table F.16.”
Page 983	Step 3, 1 <sup>st</sup> line change “F.12” to “F.11”		2 <sup>nd</sup> para., last line change “F.17” to “F.16”
	Step 4, 2 <sup>nd</sup> solution line change “126” to “120”	Page 1001	Delete table F.16
	Step 4, 3 <sup>rd</sup> solution line change “21” to “20”		Change “Table F.17” to “Table F.16”
	Step 4, final solution statement change “21” to “20”	Page 1002	2 <sup>nd</sup> para., last line change “F.18” to “F.17”
	Step 5, 2 <sup>nd</sup> solution line change “21” to “20”	Page 1004	Change “Table F.18” to “Table F.17”
	Step 5, 3 <sup>rd</sup> solution line change “104.98” to “99.6”	Page 1005	Last para., 2 <sup>nd</sup> to the last line change “F.20” to “F.18”
	Step 5, final solution statement change “104.98” to “99.6”	Page 1006	Change “Table F.20” to “Table F.18”
Page 986	2 <sup>nd</sup> para., 1 <sup>st</sup> line change “F.2” to “F.1”		3 <sup>rd</sup> para., last sentence change F.21” to “F.19”
	3 <sup>rd</sup> para., 2 <sup>nd</sup> line change “F.8” to “F.16”		3 <sup>rd</sup> para., last sentence change “F.23” to “F.21”
Page 988	Step 4, 3 <sup>rd</sup> solution line delete subscript “1” with “83.5” and change to “82.5”	Page 1007	Change “Table F.21” to “Table F.19”
Page 989	1 <sup>st</sup> para., 4 <sup>th</sup> line change “F.11” to “F.10”		Change “Table F.22” to “Table F.20”
	In example F.10, 1 <sup>st</sup> line change “F.10” to “F.9”		Change “Table F.23” to “Table F.21”
	Step 2, 3 <sup>rd</sup> solution line change “176.12” to “352.24”	Page 1008	Last para., 4 <sup>th</sup> line change “F.16” to “F.17”
	Step 2, final solution statement change “176.12” to “352.24”		1 <sup>st</sup> para., 11 <sup>th</sup> line change “meters” to “feet”
Page 992	In example F.12, 1 <sup>st</sup> line change “F.12” to “F.11”		1 <sup>st</sup> para., 11 <sup>th</sup> line change “8 feet” to “7.3 meters”
	In example F.12, Step 1, 1 <sup>st</sup> line change “F.7” to “F.6”		3 <sup>rd</sup> para., last line change “F.24” to “F.22”
Page 993	Step 3, 2 <sup>nd</sup> line change “F.12” to “F.11”	Page 1009	Change “Table F.24” to “Table F.22”
Page 994	In table F.13, in the title change “F.12” to “F.13”		1 <sup>st</sup> para., 1 <sup>st</sup> line change “F.25” to “F.23”
	In table F.13 caption, change “F.12” to “F.13”		Change “Table F.25” to “Table F.23”
Page 995	Step 1, 1 <sup>st</sup> line delete “using equation F.11”		2 <sup>nd</sup> para., 1 <sup>st</sup> line change “F.26” to “F.24”
			Change “Table F.26” to “Table F.24”

## 18<sup>th</sup> Edition Errata

Page 1010	2 <sup>nd</sup> para., 4 <sup>th</sup> line change “F.27” to “F.25”
Page 1011	Change “Table F.27” to “Table F.25” Table F.27, Step 2, 2 <sup>nd</sup> row change “13.21” to “F.20” Table F.27, Step 3, 3 <sup>rd</sup> row change “F.21” to “F.20” Table F.27, Step 7, 3 <sup>rd</sup> row, continue sentence by adding: "around the high-voltage line shown in figure F.20. Maximum pickup results if the high-voltage line and the loop lie in one plane (Case1).When the loop is inclined to the power line, the induced current is lowered (Case 2). Minimum pickup results when the loop is perpendicular to the high-voltage line (Case 3)." 1 <sup>st</sup> para., 1 <sup>st</sup> row change “F.19” to “F.20” 1 <sup>st</sup> para., 2 <sup>nd</sup> row change “current” to “voltage” 1 <sup>st</sup> para., last line change “F.28” to “F.26” 2 <sup>nd</sup> para., 4 <sup>th</sup> and 5 <sup>th</sup> rows delete “The induced voltage into the blast line can be calculated by equation F.18 (provided for reference)”
Page 1012	Change “Table F.28” to “Table F.26” Equation F.18, remove “D” from numerator 1 <sup>st</sup> para., 3 <sup>rd</sup> line change “13.20” to “F.20” 1 <sup>st</sup> para., 4 <sup>th</sup> line delete “Therefore, angle a = 90°” Equation F.19, remove “D” from the numerator 3 <sup>rd</sup> para., 1 <sup>st</sup> line change “F.22” to “F.21”
Page 1013	Table F.19, change to “Table F.27”