Errata Sheet for
S. D. Rajan, Introduction to Structural Analysis & Design (1st Edition)
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Chapter	Page	Correction
2	29	The concentrated force shown in Fig. E2.1.1(i) should be 1000 lb not 100 lb.
2	33	In Set 2, the last equation should be the moment equation about B not O.
2	39	In the check substep, ⌢ is missing in the moment equation
2	40	**Problem 2.5.3**. The concentrated moment should have the units k-ft not k/ft.
2	54	Fig. P2.7.4: The roller support should be labeled E.
2	70	Section 2.8.2...Third sentence should read "Such a graph..." not "Such as graph"
2	85	**Problem 2.8.22**. Change the support at A from a fixed support to a pin support.
2	88	Moment equation under Fig. E2.8.7(d) should read $0 = -M + C_y(x_2) - 200x_2(x_2/2)$. The sign before 200 is minus not plus.
2	89	Fig. E2.8.8(a) is not drawn to scale.
2	97	The direction for the shear force in Fig. E2.8.10(e) should be reversed. Hence the expression for V(x) and the direction in Fig. E2.8.10(f) should be reverse.
2	98	Fig. E2.8.10(g). The curvature shown for member BC is incorrect. The bottom fiber is actually in compression.
2	103	**Problem 2.8.32**: Change the support at D from a roller support to a pin support.
3	135	**Example 3.2.3**. Results from Example 2.8.7 have not been copied properly into this example. The axial force in column AB is 1500 lb not 2500 lb. Hence the computed compressive stress should be -673 psi. The largest shear stress in beam BC occurs at C not at B. The largest bending stress is 2109 psi since the largest bending moment is 15625 lb-ft (at a distance of 12.5 ft from C) not 13125 lb-ft.
3	136	**Problem 3.2.6**. The distance *10 in* in Fig. P3.2.6(a) is from the bottom of top flange to the top of bottom flange. Hence the total height of the beam cross-section is 14 in.
3	158	Wind analysis procedure. Step 2: The term in the equation is v^2 not v2.
3	158	In the table titled Design Pressures, the second term in the equation for p should read $q_h(GC_{pi})$ not $qh(GC_{pi})$.
3	161	In the table titled Design Pressures, the expressions under the $-(GC)_{pi}$ column has an error. The last component of the expression should read -19.0(-0.18) not -19.0(0.18).
3	167	For both "For warm roofs" and "For cold roofs" change $0 > 70°$ to $\boldsymbol{q} > 70°$
3	173	In the 5th sentence, change $f'(x) = 3x^3 - 18x + 24$ to $f'(x) = 3x^2 - 18x + 24$

3	181	Equation (E3.7.3a) change $s_{max} = \dfrac{3wL^2}{4b^2}$ to $s_{max} = \dfrac{3wL^2}{4b^3}$.
3	182	2 sentence above Fig. E3.7.3(b), change $V = 200,169\, in^3$ to $V = 20,169\, in^3$.
3	182	Last sentence, change $b = 1008.45 / 4h^2$ to $b = 1008.45 / 4b^2$.
3	183	2 sentence above Observation, change $V = 20,088\, in^3$ to $V = 20,169\, in^3$.
3	186	Eqn. (E3.7.4b) should read $r_i = \sqrt{\dfrac{P}{10.56p}}$ not $r_i = \sqrt{\dfrac{P}{15.36p}}$.
4	192	Second paragraph, last sentence. Delete the first occurrence of the word "used".
4	226	Third paragraph starting with "The computation ...". "The virtual unit load is applied at A." should read "The virtual unit load is applied at C."
4	230	In Fig. E4.5.2(b), the vertical reaction at A is shown to indicate that in a later step its value will be used. The correct direction for the reaction in the SVL is downwards not upwards.
4	231	For segment AB, in FBD(SVL), the reaction at A should be 0.1 not 0.5.
4	234	**External Loads**. "Let us assume that is ..." should read "Let us assume that it is..."
4	234	**External Loads**. "...let the force in a typical member by N." should read "...let the force in a typical member be N."
4	237	**Example 4.5.5**. Step 1. "is the fabrication ..." should read "is the fabrication error...". Step 2. "On can imagine ..." should read "One can imagine..."
4	240	**Problem 4.5.14**. The problem statement should read $I_{BC} = 2I_{AB} = 2I$ not $I_{BC} = I_{AB} = 2I$.
5	255	Step 2. In the table, the FBD for segment DB has an error. The reaction at A labeled 130 should act upwards not downwards.
5	261	**Problem 5.1.5**. The roller support should be labeled B not A.
5	266	In the equation for $(\Delta_D)_x$ the moment expression in the first term should read $-x^2$ not $-\dfrac{x^2}{2}$. In the next line, Δ_C should actually be $(\Delta D)_x$.
5	266	Step 4. Equation should be moments about C not A.
5	267	Fig. E5.1.7(e). Bending moment at B should be 38.5 not 31.5.
5	271	Second paragraph, Second sentence: Instead of "We now examine..." read "We now examine such a truss (simplified with joint E removed) in greater detail."
5	271	In Fig. 5.1.3.2(b), remove the vertical concentrated force acting at A.
5	277	Problem 5.1.21. The load should be 10 kN not 10 k.
5	279	Problem 5.1.26: The truss joint symbols are missing at joints B and J.
5	283	In Fig. 5.1.4.6(b), remove the horizontal concentrated force acting at A.
5	286	The second term in the expression for $a_{A\hat{B}}$ should be $-\dfrac{x_1}{6}$ not $\dfrac{x_1}{6}$.

		Step 4. Second Equation. The term multiplying M_A should be (9/4EI) not (9/EI).
5	290	The limits of the integral for q_B are from b to L and not from 0 to L.
5	300	General Procedure. Step 3. The figure number should be 5.2.1.1 not 5.2.11.
5	314	In FBD IV, the direction of V_{B1} should be down not up.
5	323	The label B_x in FBD of member BC (top of page) should read $\hat{B}_x$ since this force changes between the FBD for AB and FBD for BC.
5	327	At the bottom of the page: "From the FBD of beam BD, we have" should be followed by $\overset{\curvearrowright}{\sum} M_B = 0$ not $\sum M_D = 0$.
5	328	**Problem 5.2.3**. Without a roller support at B, the problem is exactly the same as Problem 5.6. Introduce a roller support at B.
5	331	**Problem 5.2.14.** Write the two Slope-Deflection equations for M_{AB} and M_{BA} as usual…. simplify the equation for M_{AB}.
5	332	**Problem 5.3**. The support at D should be a roller support capable of moving horizontally.
5	333	**Problem 5.6**. Dimensions are missing. Take the dimensions to be the same as those used in Problem 5.2.3, i.e. each span is 5 m.
6	337	Eqn. (6.1.1.1) should have $A_{m \times n}$ not $A_{m \times x}$.
6	338	In the definition of the upper triangular matrix, change i < j to i > j. In the definition of the lower triangular matrix, change i > j to i < j.
6	344	Fig. 6.2.1.4. The displacements (degrees-of-freedom) should be labeled D_1, D_2 and D_3.
6	346	**Problem 6.2.1**. The applied load should be 20 lb not 20 lb/in.
6	353	In the line to the right of the word **SOLUTION**, change "see page 362" to "see page 350".
6	356	Step 4: D3 should be -4.44367e-3 not 4.44367e-3.
6	360	**Problem 6.2.2:** The truss joint symbol is missing at joint 1.
6	360	**Problem 6.2.3**: The truss joint symbol is missing at joint 4.
6	368	The label in Fig. 6.2.3.9(a) should be w not W.
6	370 and 371	Element 1 Stiffness: The signs of the entries in locations (2,6), (6,2), (5,6) and (6,5) need to be reversed. Element 2 Stiffness: The signs of the entries in locations (2,6), (6,2), (5,6) and (6,5) need to be reversed.
6	374 and 375	Element 1 Stiffness: The signs of the entries in locations (2,6), (6,2), (5,6) and (6,5) need to be reversed. Element 3 Stiffness: The signs of the entries in locations (2,6), (6,2), (5,6) and (6,5) need to be reversed.
6	377	Renumber all the problems in this Exercise by decreasing the problem number by one - the problems are from 6.2.13 through 6.2.20 NOT 6.2.14 through 6.2.21.

6	381	**Example 6.3.1**. The left side of the second equation in the solution should read U not U_0.
6	397	Eqn. (6.4.2.16). The entry at row 1, column 4 should be $-\dfrac{EA}{L}$ not 0.
6	399	Example 6.4.3. The element load for element 1 should read $$q'_{6\times1} = \{0 \quad -15000 \quad -25000 \quad 0 \quad -15000 \quad 25000\}$$
6	419	Eqn. (6.5.2.2) The second term in the parenthesis should read $+c_jD_j$ not $-c_jD_j$. The same correction should be made to the expression shown on the first line following Fig. 6.5.2.1.
6	424	The 87 k reaction at the second node in Fig. E6.5.4(c) should be acting downwards not upwards. The 411.4 k-ft moment reaction should be counter-clockwise not clockwise.
7	446	Member cross-sectional properties: Delete the contents within the parenthesis "(the rough .... 6 mm)". and change the Area to 0.8 m^2 and the Moment of inertia to 0.7 m^4. Make the corrections as a result of this on the output shown on page 448.
7	447	Element Data Table. There is NO element 2. Delete the second row in the table.
8	505	Example 8.3.1. Make the following corrections. $$\frac{\partial L}{\partial x_1} = 0 = 4 + 4I_1x_1 \Rightarrow x_1 = -\frac{1}{I_1}.$$ $$I_1 = \frac{3}{2}: x_1^* = -\frac{2}{3}; x_2^* = \frac{1}{3}; f(x^*) = -3$$ $$I_1 = -\frac{3}{2}: x_1^* = \frac{2}{3}; x_2^* = -\frac{1}{3}; f(x^*) = 3.$$ The final solution is as follows: $x_1^* = -2/3, x_2^* = 1/3, f(x^*) = -3$.
8	512	Table on top of page. The Decimal value associated with Binary 001 should be 2.28571 not 2.25571.
8	515	Third line. "... point in chosen." should read "... point is chosen."
8	522	The solution presented is incorrect. Change the upper bounds to 50 (instead of 20). The final result is h=36.5 cm and $f(\mathbf{x})$ = 7327 cm^3.
8	529	Fig. 8.7.1. The truss on the top right is incorrect. Its (member arrangement) should be exactly the same as the truss on the top left.
8	535	Fig. 8.7.4.1: Label the element between C and E as 9 not 7.
8	557	The material should be 0.2% HR steel.
8	563	**Problem 8.8.5 and Problem 8.8.6**. The material should be 0.2% HR steel.
Answers to Selected Problems	643	**Problem 1.1(c).** The answer should be $1.1229(10^{-6})$slug/in^3 not the value of a force.

	644	**Problem 2.7.8**. Change $F_{HC}=F_{FC}=2250.6$ lb(T) to $F_{HG}=F_{FG}=2250.6$ lb(T)
	645	**Problem 2.8.18**. Change the shear force at B from -7.72 to -7.22.
	645	**Problem 2.8.21**. The curvatures shown in the moment diagram should be opposite of what are shown in the figure.
	645	**Problem 4.3.7**. Both the rotations are clockwise.
	649	**Problem 3.6**. The required inner radius is 0.71 in with a wall thickness of 0.11 in.
	650	**Problem 5.1.16**. The reaction labeled C_y should actually be D_y.
	651	**Problem 5.2.12**: M_{CD} should be -136.3 k-ft.
	654	The solution labeled 6.2.18 should actually read 6.2.19.
	654	The solution labeled 6.2.19 should actually read 6.2.20.
	664 and 665	The unit for Area is in^2 not in^3.
	679	In section d. the second derivative of the cubic function should read $f''(x) = 6ax + 2b$ not $f''(x) = 6ax^2 + 2b$.
Appendix E	679	The line types (light solid and dashed lines) for the first and the second graphs are switched.
Inside back Cover		The formula for the fixed-end moments for a concentrated load should read $FEM_{BA} = \dfrac{Pa^2b}{L^2}$. The figure has the right expression.
Inside Front Cover		Area of the pipe should read $A = pt(t+2r)$. Make the same correction in Appendix B.
First Page		The rotation at B on the cantilever beam with the UDL should read $q_B = \dfrac{wL^3}{3EI}$ not $q_B = \dfrac{wL^2}{3EI}$.
Inside Front Cover		The formulae for the moment of inertia of the rectangular hollow tube section account only for the outer rectangle. The contribution from the inner rectangle needs to be subtracted. Make the same correction in Appendix B. $$I_x = \frac{1}{12}\left[(b+2t)(h+2w)^3 - bh^3\right] \qquad S_x = \frac{I_x}{0.5h+w}$$ $$I_y = \frac{1}{12}\left[(h+2w)(b+2t)^3 - hb^3\right] \qquad S_y = \frac{I_y}{0.5h+t}$$