

# SOILS IN CONSTRUCTION 5TH EDITION SOLUTION MANUAL

## Download Complete File

### Soils in Construction: 5th Edition Solution Manual

**Question:** Determine the average unit weight of a saturated, fine-grained soil that has a bulk density of  $14.5 \text{ kN/m}^3$  and a specific gravity of 2.65.

**Answer:**

The average unit weight ( $\gamma$ ) can be calculated using the following formula:

$$\gamma = \gamma_w G_s (1 - w)$$

where:

- $\gamma_w$  = unit weight of water ( $9.81 \text{ kN/m}^3$ )
- $G_s$  = specific gravity of soil (2.65)
- $w$  = water content (can be determined from bulk density and specific gravity)

First, calculate the water content ( $w$ ):

$$w = (\gamma_d - G_s \gamma_w) / (G_s \gamma_w) \quad w = (14.5 \text{ kN/m}^3 - 2.65 \cdot 9.81 \text{ kN/m}^3) / (2.65 \cdot 9.81 \text{ kN/m}^3)$$
$$w \approx 0.196$$

Now calculate the average unit weight:

$$\gamma = 9.81 \text{ kN/m}^3 \cdot 2.65 (1 - 0.196) \approx 20.2 \text{ kN/m}^3$$

**Question:** A soil has the following properties:

- Effective cohesion ( $c'$ ) = 10 kPa
- Effective friction angle ( $\phi'$ ) =  $30^\circ$
- Bulk density ( $\gamma$ ) = 18 kN/m<sup>3</sup>
- Water content ( $w$ ) = 15%

Determine the undrained shear strength ( $S_u$ ) of the soil.

**Answer:**

For a saturated, fine-grained soil, the undrained shear strength can be estimated using:

$$S_u = c' + (\gamma_w - \gamma) \frac{w}{100} \tan(\phi')$$

where:

- $\gamma_w$  = unit weight of water (9.81 kN/m<sup>3</sup>)
- $\gamma$  = unit weight of soil (18 kN/m<sup>3</sup>)

Substituting the given values:

$$S_u = 10 \text{ kPa} + (18 \text{ kN/m}^3 - 9.81 \text{ kN/m}^3) \frac{15}{100} \tan(30^\circ) = 12.6 \text{ kPa}$$

**Question:** A strip footing with a width of 1.5 m is founded at a depth of 2 m below the ground surface. The soil at the site has the following properties:

- Shear strength parameters:  $c' = 15 \text{ kPa}$ ,  $\phi' = 35^\circ$
- Unit weight ( $\gamma$ ) = 18 kN/m<sup>3</sup>

Calculate the ultimate bearing capacity ( $q_u$ ) of the soil.

**Answer:**

For a strip footing in a soil with  $c'$  and  $\phi'$ , the ultimate bearing capacity can be calculated using:

$$q_u = c' N_c + \gamma D_f N_q + 0.5 \gamma B N_\gamma$$

where:

- $N_c$ ,  $N_q$ , and  $N_\gamma$  are bearing capacity factors
- $D_f$  is the depth factor
- $B$  is the footing width

Substituting the given values and using appropriate bearing capacity factors, we get:

$$q_u = 15 \text{ kPa} + 5.14 + 18 \text{ kN/m}^3 \cdot 2 \text{ m} + 1.87 + 0.5 \cdot 18 \text{ kN/m}^3 \cdot 1.5 \text{ m} = 1.0 \cdot q_u = 200 \text{ kPa}$$

**Question:** A pile is being driven into a soil with a unit weight of  $20 \text{ kN/m}^3$ . The pile has a diameter of  $0.5 \text{ m}$  and a length of  $10 \text{ m}$ . The soil has an adhesion factor of  $\alpha = 0.4$ . Calculate the ultimate pile capacity due to skin friction.

**Answer:**

The ultimate pile capacity due to skin friction ( $Q_s$ ) can be calculated using:

$$Q_s = \alpha \cdot \sigma'_s \cdot \pi \cdot D \cdot L$$

where:

- $\sigma'_s$  is the effective stress on the pile shaft
- $D$  is the pile diameter
- $L$  is the pile length

Assuming a constant effective overburden pressure at the pile tip, we can calculate  $\sigma'_s$  as:

$$\sigma'_s = \gamma \cdot (L - D/2)$$

Substituting the given values:

$$Q_s = 0.4 \cdot 20 \text{ kN/m}^3 \cdot (10 \text{ m} - 0.5 \text{ m}/2) \cdot \pi \cdot 0.5 \text{ m} \cdot 10 \text{ m} = 125.6 \text{ kN}$$

## Section 8.5: Solving Rational Equations

**Question 1:** Solve the rational equation:

$$\frac{x}{x-2} = \frac{3}{x-4}$$

**Answer:**

1. Multiply both sides by  $(x-2)(x-4)$  to clear the denominators:  $x(x-4) = 3(x-2)$
2. Expand and simplify:  $x^2 - 4x = 3x - 6$
3. Move all terms to one side:  $x^2 - 7x + 6 = 0$
4. Factor and solve:  $(x-6)(x-1) = 0$   $x = 6, 1$

**Question 2:** Solve the rational equation:

$$\frac{2}{x+1} - \frac{1}{x-1} = \frac{5}{x^2-1}$$

**Answer:**

1. Factor the denominator:  $\frac{2}{x+1} - \frac{1}{x-1} = \frac{5}{(x+1)(x-1)}$
2. Multiply both sides by  $(x+1)(x-1)$ :  $2(x-1) - 1(x+1) = 5$
3. Expand and simplify:  $2x - 2 - x - 1 = 5$
4. Solve for x:  $x = 8$

**Question 3:** Solve the rational equation:

$$\frac{x-1}{x+2} + \frac{x+1}{x-2} = \frac{8}{x^2-4}$$

**Answer:**

1. Factor the denominator:  $\frac{x-1}{x+2} + \frac{x+1}{x-2} = \frac{8}{(x+2)(x-2)}$
2. Multiply both sides by  $(x+2)(x-2)$ :  $(x-1)(x-2) + (x+1)(x+2) = 8$
3. Expand and simplify:  $x^2 - 3x + 2 + x^2 + x - 2 = 8$
4. Combine like terms and rearrange:  $2x^2 - 2x = 8$
5. Divide both sides by 2:  $x^2 - x = 4$
6. Solve using the quadratic formula:  $x = \frac{1 \pm \sqrt{1+8}}{2} = \frac{1 \pm 3}{2}$   $x = 2$  or  $x = -1$

**Question 4:** Solve the rational equation:

$$\frac{3}{x} - \frac{4}{x+3} = \frac{1}{x(x+3)}$$

**Answer:**

1. Multiply both sides by  $x(x+3)$ :  $3(x+3) - 4x = 1$
2. Expand and simplify:  $3x + 9 - 4x = 1$
3. Solve for  $x$ :  $x = -8$

**Question 5:** Solve the rational equation:

$$\frac{2x}{x-1} - \frac{x+1}{x+2} = \frac{x^2-5x+2}{x^2+x-2}$$

**Answer:**

1. Multiply both sides by  $(x-1)(x+2)$ :  $2x(x+2) - (x+1)(x-1) = x^2-5x+2$
2. Expand and simplify:  $2x^2 + 4x - (x^2 - 1) = x^2-5x+2$
3. Combine like terms and rearrange:  $x^2 + 9x - 3 = 0$
4. Solve using the quadratic formula:  $x = \frac{-9 \pm \sqrt{9^2-4(1)(-3)}}{2(1)} = \frac{-9 \pm 15}{2}$   
 $x = 3$  or  $x = -6$

### **Spelling Practice Book Grade 4 Teachers Edition Harcourt Trophies**

**Q: What is the Harcourt Trophies Spelling Practice Book Grade 4 Teachers Edition?** **A:** It is a comprehensive resource designed to enhance spelling instruction in fourth grade classrooms. It aligns with the Harcourt Trophies Reading Program and provides systematic and engaging practice for students.

**Q: What features does the book contain?** **A:** The book features weekly spelling lists that are organized by thematic units. Each unit includes a variety of activities, such as word sorts, dictation exercises, and interactive games. It also includes a teacher's guide with lesson plans, reproducibles, and assessments to support instruction.

**Q: How does the book support spelling instruction?** **A:** The book provides a structured approach to spelling by introducing new words each week and reinforcing them through various activities. It also incorporates a multi-sensory approach, allowing students to engage with words through auditory, visual, and kinesthetic modalities.

**Q: How can teachers use the book effectively?** A: Teachers can incorporate the book into their weekly spelling routines by utilizing the provided lesson plans. They can also supplement the activities with additional resources and games to make the learning process more engaging. The teacher's guide offers guidance and support to ensure effective implementation.

**Q: What are the benefits of using the Harcourt Trophies Spelling Practice Book Grade 4 Teachers Edition?** A: The book enhances spelling proficiency, strengthens vocabulary development, and improves reading comprehension. It provides differentiated instruction by incorporating a variety of activities to cater to diverse learner needs. Additionally, it aligns with the Harcourt Trophies Reading Program, ensuring consistency and continuity in language arts instruction.

### **System Analysis & Design: A Comprehensive Guide**

"System Analysis & Design, 5th Edition" by Alan Dennis is a widely acclaimed textbook that provides a comprehensive overview of the principles and practices of system analysis and design. Here are some frequently asked questions and answers about this essential text:

**Q: What is the key focus of "System Analysis & Design"?**

A: The book covers the entire system development life cycle (SDLC), from gathering requirements to implementing and maintaining systems. It emphasizes the use of structured techniques and methodologies to ensure the delivery of high-quality, cost-effective systems.

**Q: What are the salient features of the 5th edition?**

A: The 5th edition incorporates the latest technological advancements and industry best practices. It includes updated chapters on cloud computing, agile development, and business process modeling. Additionally, it offers expanded coverage of data analytics, user experience (UX), and artificial intelligence (AI).

**Q: How does the book address real-world challenges?**

A: To provide a practical understanding of the subject matter, the book includes numerous case studies and examples. It also introduces students to industry-standard tools, such as UML modeling and business process automation software.

**Q: What are the benefits of using this textbook for students?**

A: "System Analysis & Design, 5th Edition" empowers students with the knowledge and skills necessary to become successful system analysts and designers. It enhances their problem-solving abilities, analytical thinking, and communication skills.

**Q: Is the book suitable for both undergraduate and graduate programs?**

A: Yes, the book is designed to be accessible for students at both undergraduate and graduate levels. It provides a solid foundation for those new to the field and advanced insights for those seeking to expand their knowledge and expertise.

[section 8 5 solving rational equations](#), [spelling practice book grade 4 teachers edition harcourt trophies](#), [system analysis design 5th edition alan dennis](#)

microbiology laboratory manual answers msbi training naresh i technologies paris  
1919 six months that changed the world first course in numerical methods solution  
manual dell w3207c manual komatsu wa 300 manual craftsman brad nailer manual  
food rebellions crisis and the hunger for justice governmental and nonprofit  
accounting 6th edition euro van user manual liofilizacion de productos farmaceuticos  
lyophilization of pharmaceutical products spanish edition fundamentals of computer  
graphics peter shirley design concepts for engineers by mark n horenstein 2007 can  
am renegade service manual service manual solbat haynes manual for 96 honda  
accord cursive letters tracing guide power and military effectiveness the fallacy of  
democratic triumphalism mercedes benz service manual 220se mind the gap english  
study guide california content standards mathematics practice and mastery  
benchmark test grade 7 question and answer key included hyundai tiburon car  
service repair manual 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005  
2006 2007 download citroen berlingo van owners manual fi a world of differences  
—operation management solution manual kawasaki z250 1982 factory service repair  
SOILS IN CONSTRUCTION 5TH EDITION SOLUTION MANUAL

manual management training manual pizza hut  
fgwilsonp50 2manualmastering legalanalysisand communicationjobskill  
superbook8firefighting emergencymedicaltechnician emtparamedicjob  
guidedigitalsignal processingprinciples algorithmsandapplications 4theditionfree  
truetothe gameii2 teriwoods qualitymanagement bymmahajan  
completesaraswatiscience labmanual cbseclass 9biografi judikadalambahasa  
inggrisiyama mf8617aat monitorrepairmanual acer2010 buyersguidesuzuki gsxr600  
19972000service repairmanual yamahapsr47 manualthe completetextbookof  
phlebotomyscottforesman sciencestudy guidegrade5 resolvein  
internationalpoliticsprinceton studiesinpolitical behaviorjvc kds36manual beingand  
timeharperperennial modernthought environmentalmanagement  
objectivequestionsbmc thorneycroft154 manualrelational databasedesign  
clearlyexplained 2nd02 byharringtonjan lpaperback 2002cal fire4300manual  
factorscontributingto schooldropout amongthe girlsa socialandpolitical  
thoughtofamerican progressivismthe americanheritage seriesentrenamientosix  
packluce tusixpack en6 semanasspanish editionshonaa levelpast  
exampapershyundai santafe2001 thru2009haynes repairmanualsafeguarding  
adultsin nursingpractice transformingnursing practiceseriesyamaha 125ccscooter  
shopmanualembedded linuxdevelopment usingeclipse nowlaboratorytest reportfor  
fujitsu12rlsand mitsubishife12namini splitheat pumpscanonmanuals  
freedownloadphysics forscientistsengineers knight3rdedition testbank 92jeep  
wranglerrepairmanual