

SOLVED PROBLEMS IN FOUNDATION ENGINEERING FURNITUREORE

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Solved Problems in Foundation Engineering

1. Determine the allowable bearing capacity of a clay soil with unconfined compressive strength (q_u) of 1.5 tons/sq. ft. and a factor of safety of 3.

Answer: Allowable bearing capacity = $q_u / \text{FoS} = 1.5 \text{ tons/sq. ft.} / 3 = 0.5 \text{ tons/sq. ft.}$

2. Design a spread footing for a column with an axial load of 100 tons. The soil conditions are: cohesion (c) = 1 ton/sq. ft., angle of internal friction (ϕ) = 30 degrees, and unit weight (γ) = 1.2 tons/cu. ft.

Answer: Ultimate bearing capacity = $1.3cN_c + 0.65\gamma N_q = 1.3 \cdot 1 \cdot 6.2 + 0.65 \cdot 1.2 \cdot 10.3 = 11.9 \text{ tons/sq. ft.}$

Allowable bearing capacity = Ultimate bearing capacity / FoS = $11.9 / 3 = 3.97 \text{ tons/sq. ft.}$

Required footing area = $100 \text{ tons} / 3.97 \text{ tons/sq. ft.} = 25.19 \text{ sq. ft.}$

3. Determine the settlement of a cohesive soil foundation under a uniformly distributed load of 1 ton/sq. ft. The soil parameters are: thickness of compressible layer (H) = 10 ft., modulus of elasticity (E) = 1000 tons/sq. ft., and Poisson's ratio (μ) = 0.3.

Answer: Settlement = $(q \cdot H) / ((1 - \mu) \cdot E) = (1 \cdot 10) / ((1 - 0.3) \cdot 1000) = 0.015 \text{ ft.}$

4. Design a pile foundation for a bridge pier that will support a load of 500 tons. The soil conditions are: cohesionless soil with relative density (D_r) = 60%, unit weight (γ) = 1.5 tons/cu. ft., and pile diameter (d) = 12 inches.

Answer: Ultimate pile capacity = $q_d N_{60} \cdot H = 0.75 \cdot 1 \cdot 50 \cdot 1.5 \cdot 30 = 187.5$ tons

Required number of piles = $500 \text{ tons} / 187.5 \text{ tons} = 2.67$

Round up to 3 piles.

5. Determine the lateral pressure exerted by a retaining wall with a height of 10 ft. backed by a cohesive soil with cohesion (c) of 1.2 tons/sq. ft.

Answer: Lateral pressure = $c \cdot H = 1.2 \cdot 10 = 12$ tons/sq. ft.

The Middle Ages: Everyday Life in Medieval Europe

The Middle Ages, spanning from the 5th to the 15th centuries, was a transformative period that shaped the foundations of Western civilization. Life for ordinary people during this era was vastly different from today, characterized by a blend of feudalism, religious influence, and social stratification.

1. What was daily life like for peasants? Peasants, the vast majority of the population, lived a life of hard labor and subsistence farming. Their days began before dawn, tending to the fields and livestock. They typically lived in small villages, with their homes constructed from wood, thatch, and mud. Sanitation was poor, and diseases were rampant.

2. How did the feudal system impact everyday life? Feudalism played a central role in organizing medieval society. Peasants were bound to the land they worked and owed allegiance to a lord. In exchange, the lord provided protection and justice. This system created a rigid social hierarchy, with the nobility at the top, followed by knights, clergy, and peasants at the bottom.

3. What was the role of religion in medieval life? Religion permeated every aspect of medieval life. The Catholic Church wielded immense power and influence, shaping laws, morals, and daily routines. People attended mass regularly, prayed for both the living and the dead, and sought guidance from the clergy. Religion provided

comfort and meaning in an often harsh world.

4. How did people spend their free time? Despite their arduous daily lives, medieval people also found time for recreation. Festivals, such as the Feast of Fools and May Day, provided opportunities for entertainment and social gatherings. People enjoyed music, dancing, and games. Taverns served as gathering places for storytelling, drinking, and gambling.

5. What were the key challenges facing medieval Europeans? The Middle Ages was a time of both progress and adversity. Disease, famine, and warfare were constant threats. Epidemics, such as the Black Death, decimated entire populations. In times of conflict, peasants and townsfolk were often caught in the crossfire of feudal wars and invasions. Despite these challenges, medieval Europeans exhibited resilience and ingenuity, laying the groundwork for future advancements.

"The Rainmaker": Unraveling the Legal Thriller by John Grisham

"The Rainmaker" by John Grisham is a gripping legal thriller that delves into the depths of corporate greed and the fight for justice. The novel follows the story of Rudy Baylor, a young and idealistic lawyer who takes on a seemingly impossible case against a powerful insurance company.

1. What is the premise of "The Rainmaker"?

The premise of "The Rainmaker" centers around the fictional town of Biloxi, Mississippi, where Rudy Baylor represents a poor family whose son has been diagnosed with leukemia. The insurance company, Great Benefit, denies their claim, leaving the family desperate and in need of justice.

2. What is the significance of the nickname "The Rainmaker"?

Rudy Baylor earns the nickname "The Rainmaker" due to his ability to secure large settlements for his clients. In the insurance industry, lawyers who file successful lawsuits against companies are often referred to as "rainmakers" because they bring in a "rain" of money for their clients.

3. What are the key themes of the novel?

"The Rainmaker" explores themes of corporate greed, the struggle for justice, and the importance of confronting powerful entities. Grisham portrays the lengths that corporations will go to protect their profits, highlighting the plight of those who are wronged by them.

4. What are the main conflicts in the story?

The primary conflict in the novel is the legal battle between Rudy Baylor and Great Benefit. Baylor must overcome numerous obstacles, including the company's vast resources and the prejudice against him as a young and inexperienced lawyer. Additionally, Baylor faces internal struggles as he grapples with the weight of the case and the consequences of his actions.

5. What is the resolution of the case?

"The Rainmaker" culminates in a dramatic courtroom showdown where Rudy Baylor presents a compelling case against Great Benefit. The outcome of the trial is both satisfying and thought-provoking, as it exposes the true nature of the insurance industry and the power of justice.

True Ghost Stories: Unsettling Tales of the Paranormal

From haunted castles to eerie forests, the world is filled with tales of ghostly encounters that have left an enduring mark on history. Many of these stories have been passed down through generations, becoming legends that both fascinate and terrify listeners. However, beyond the realm of folklore, there are also countless true ghost stories that provide chilling evidence of the supernatural.

What is a True Ghost Story?

A true ghost story is a firsthand account of an encounter with a supernatural being or entity. These stories are often told by witnesses who claim to have experienced something unexplainable or paranormal, such as seeing a ghost, hearing disembodied voices, or feeling a cold spot in an otherwise warm room.

Why are True Ghost Stories So Scary?

True ghost stories are inherently scary because they challenge our rational understanding of the world. They suggest that there is something beyond our everyday reality that we cannot fully comprehend. The unknown is always frightening, and ghost stories tap into this deep-seated fear.

Where Can You Find True Ghost Stories?

True ghost stories can be found in a variety of places, including books, websites, and personal accounts. Some of the most famous ghost stories have been recorded in history and literature, such as the story of the ghosts of the Tower of London or the ghost of Anne Boleyn.

How Do You Know if a True Ghost Story is Real?

There is no foolproof way to determine if a true ghost story is real. However, there are some indicators that can lend credibility to a story, such as multiple witnesses, detailed descriptions, and a lack of obvious motives for the witness to lie.

Conclusion

True ghost stories are both fascinating and terrifying, offering a glimpse into the unknown. They challenge our assumptions about reality and leave us wondering what might be lurking in the shadows. Whether you believe in ghosts or not, these stories are a testament to the power of imagination and the human fascination with the mysteries of the supernatural.

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