吴兴征老师指导的2021级土木工程毕业设计列表（2025年）

NO	毕设论文题目	学号	姓名	备注
1	地热能源桩设计与方案比选	20211902171	齐超	I2101
2	海上风电导管式桩基础设计与方案比选	20211902046	韩梓瑞	I2102
3	高层建筑复合桩基设计及方案比选	20211902059	李伟星	I2103
4	大型悬索桥桩基础设计与方案比选	20211902011	魏鑫桐	I2104
5	北京通州交通枢纽灌注支盘桩设计方案比选	20201703039	张博业	I2105

NO	Title	Student number	Name	Note
1	Design and Scheme Comparison of Geothermal Energy Piles	20211902171	ChaoQi	I2101
2	Design and Solution Comparison forOffshore Wind Jacket Pile Foundations	20211902046	ZiruiHan	I2102
3	Design and scheme comparison of composite pile foundation for high-rise buildings	20211902059	Weixing Li	I2103
4	Design and scheme comparison of pile foundation for large suspension bridges	20211902011	XintongWei	I2104
5	Design Scheme Comparison of Perfusion Branch-Pile in Beijing Tongzhou Transportation Hub	20201703039	BoYeZhang	I2105

No	毕设论文题目	学号	姓名	备注
1	地热能源桩设计与方案比选	20211902171	齐超	I2001

软土地基上防洪海堤稳定设计是水利工程领域的重要课题。软土地基的特性使得防洪海堤的设计和施工面临挑战，如地基沉降、侧向变形等问题。为确保防洪海堤的稳定性和安全性，需要深入研究软土地基的工程特点和力学性质，探讨针对软土地基的防洪海堤设计原则和方法。通过对软土地基防洪海堤设计的系统研究，可以为工程实践提供科学依据，提高防洪工程的抗灾能力和可持续发展水平。

本文旨在探讨软土地基上防洪海堤稳定设计。首先分析了软土地基的特性，包括工程特点、力学性质和水文地质特征。然后阐述了防洪海堤的设计原理，包括功能、设计标准、稳定性分析方法。接着提出了针对软土地基的防洪海堤设计方法，包括影响因素、设计原则和施工技术。最后介绍了漫顶稳定分析、边坡稳定计算方法以及地基沉降量计算，并通过工程实例分析和案例研究进行验证。通过本文的研究，可以为软土地基上防洪海堤的稳定设计提供理论支持和实践指导。

关键词：边坡稳定；渗透梯度；软土地基；漫顶高程；抗滑稳定

The stable design of flood control levees on soft soil foundations is an important topic in the field of water conservancy engineering. The characteristics of soft soil foundations pose challenges to the design and construction of flood control levees, such as foundation settlement and lateral deformation. In order to ensure the stability and safety of flood control levees, it is necessary to conduct in-depth research on the engineering characteristics and mechanical properties of soft soil foundations, and explore the design principles and methods for flood control levees on soft soil foundations. Through systematic research on the design of flood control levees on soft soil foundations, scientific basis can be provided for engineering practice, improving the disaster resistance and sustainable development level of flood control projects.

This article aims to explore the stable design of flood control embankments on soft soil foundations. Firstly, the characteristics of soft soil foundations are analyzed, including engineering features, mechanical properties, and hydrogeological characteristics. Then, the design principles of flood control embankments are elaborated, including functions, design standards, and stability analysis methods. Subsequently, a design method for flood control embankments on soft soil foundations is proposed, covering influencing factors, design principles, and construction techniques. Finally, the methods for analysis of crest stability and slope stability are introduced, and validated through engineering case studies and analysis. Through the research in this article, theoretical support and practical guidance can be provided for the stable design of flood control embankments on soft soil foundations.

Key Words：Slope stability; Percolation gradient; Soft soil foundation; Overflow level elevation; Anti-sliding stability

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2	海上风电导管式桩基础设计与方案比选	20211902046	韩梓瑞	I2102

目前全球能源低碳化、绿色化是大势所趋，海上风电凭借其资源丰富且发电稳定的优势，成为实现“双碳”目标新生力量。而复杂多变的海洋环境，对风机基础设计提出了更高要求，特别是深远海区域海上风电的桩基础，需承受多维动态荷载的耦合作用。本文以南海北部湾海域为背景，对导管式桩基础进行设计与方案比选，设计安全、经济、适用于深海环境的基础。

在项目初始阶段，首先对施工区域的地质状况、风机参数及海洋气象水文资料进行全面深入分析，随后依据相关规定要进行风力荷载、波浪荷载及水流荷载的计算，在此过程中，分别运用莫里森方程法与 m 法对桩基内力和变形开展详细分析。设计采用外径 5.5m、壁厚 100mm 钢管桩作为初始方案，经过验算，竖向抗压及水平承载力均满足极端工况需求，且强度、刚度和稳定性均满足规范要求。

通过对比不同桩径与壁厚方案，在可以满足安全储备的要求下，兼顾经济性与安全性。研究表明，导管式桩基础实现多桩协同承载与桁架优选，可有效适应深水荷载，可为深远海风电项目提供技术支撑。

本文取得的成果为海上风电基础设计提供一定理论依据与工程参考。通过方案比选，获得成本效益，有利于海上风电的大规模开发利用与降本增效。

关键词：海上风电；导管式桩基础；桩基础设计；方案比选

The global energy sector is undergoing a low-carbon and green transformation, with offshore wind power emerging as a key driver for achieving "dual carbon" goals due to its abundant resources and stable power generation. However, the complex marine environment poses significant challenges to foundation design, particularly for pile foundations in deep-sea offshore wind projects that must withstand multi-dimensional dynamic loads. This study focuses on the Beibu Gulf in the South China Sea, proposing the design and optimization of jacket pile foundations to ensure safety, cost-effectiveness, and resilience in deep-sea environments.

First, the geological conditions, turbine parameters, and marine meteorological-hydrographic data of the project area are analyzed. Wind, wave, and current loads are calculated according to design codes, and the internal forces and deformations of the pile foundation are simulated using the Morrison equation method and the *m*-method. An initial design scheme employs a steel pipe pile with an outer diameter of 5.5 m and a wall thickness of 100 mm. Verification confirms that the vertical compressive and horizontal bearing capacities meet extreme operational demands, while strength, stiffness, and stability comply with regulatory standards.

By comparing schemes with varying pile diameters and wall thicknesses, the study balances economic efficiency and safety while ensuring adequate safety margins. The results demonstrate that jacket pile foundations, through collaborative load-bearing mechanisms and optimized truss configurations,

	effectively adapt to deep-water dynamic loads, offering robust technical support for far-sea wind power projects. The findings provide theoretical insights and engineering references for offshore wind foundation design. Through scheme optimization, cost-effectiveness is achieved, facilitating large-scale offshore wind development and cost reduction. **Key Words：** Offshore wind power; Jacket pile foundation; Pile foundation design; Scheme comparison and selection

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3	高层建筑复合桩基设计及方案比选	20211902059	李伟星	I2103

随着城市化建设进程的加快，高层建筑甚至超高层建筑的数量不断增加，建筑地基不仅要具备更强的承载力，而且需要保持良好的稳定性。

本研究选取河北省邢台市的一栋 15 层住宅楼的桩基础作为分析对象。考虑到其地质环境的复杂性，本研究对复合桩基的设计及不同方案之间进行对比研究。目的是实现桩基础结构的优选，提高复合桩基的经济效益和安全性。为了实现研究目标，本文将砂石桩与灌注桩结合，形成复合桩基进行方案设计。

此外，将此方案与砂石桩与预应力混凝土管桩结合形成的复合桩基进行比选，包括施工难度和经济性方面等。本文详细阐述了以下内容：桩基结构设计的优化、承台尺寸计算、承台结构承载力计算验证、以及承台内部钢筋配筋设计等方面。

本文在方案设计和承载能力验算过程中，使用 R 语言编程进行辅助求解，极大的提高了计算效率。

关键词：复合桩基；砂石桩；灌注桩；预应力混凝土管桩；承载力验算

With the acceleration of urbanisation, the number of high-rise buildings and even super high-rise buildings is increasing, and the building foundation must not only have a stronger bearing capacity, but also maintain good stability.

In this study, the pile foundation of a 15-storey residential building in Xingtai City, Hebei Province was selected as the object of analysis. Considering the complexity of the geological environment, this study compares the design of the composite pile foundation and different schemes. The purpose is to realise the optimisation of pile foundation structure and improve the economic benefit and safety of composite pile foundation. In order to achieve the research objectives, this paper combines sand and gravel piles with cast-in-place piles to form a composite pile foundation for scheme design.

In addition, this scheme is compared with the composite pile foundation formed by the combination of sand and gravel pile and prestressed concrete pipe pile, including the construction difficulty and economic aspects. In this paper, the following contents are elaborated in detail: the optimisation of pile foundation structure design, the calculation and verification of the bearing capacity of cushion cap structure, and the design of reinforcement inside cushion cap.

	In the process of scheme design and bearing capacity check, R language programming is used to assist the solution, which greatly improves the calculation efficiency. **Key words：** Composite pile foundation; Gravel piles; Grouted piles; Prestressed concrete pipe piles; Bearing capacity calculation

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4	海上风电导管式桩基础设计与方案比选	20211902011	魏鑫桐	I2104

目前全球能源低碳化、绿色化是大势所趋，海上风电凭借其资源丰富且发电稳定的优势，成为实现“双碳”目标新生力量。而复杂多变的海洋环境，对风机基础设计提出了更高要求，特别是深远海区域海上风电的桩基础，需承受多维动态荷载的耦合作用。本文以南海北部湾海域为背景，对导管式桩基础进行设计与方案比选，设计安全、经济、适用于深海环境的基础。

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通过对比不同桩径与壁厚方案，在可以满足安全储备的要求下，兼顾经济性与安全性。研究表明，导管式桩基础实现多桩协同承载与桁架优选，可有效适应深水荷载，可为深远海风电项目提供技术支撑。

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	capacities meet extreme operational demands, while strength, stiffness, and stability comply with regulatory standards. By comparing schemes with varying pile diameters and wall thicknesses, the study balances economic efficiency and safety while ensuring adequate safety margins. The results demonstrate that jacket pile foundations, through collaborative load-bearing mechanisms and optimized truss configurations, effectively adapt to deep-water dynamic loads, offering robust technical support for far-sea wind power projects. The findings provide theoretical insights and engineering references for offshore wind foundation design. Through scheme optimization, cost-effectiveness is achieved, facilitating large-scale offshore wind development and cost reduction. **Key Words：** Offshore wind power; Jacket pile foundation; Pile foundation design; Scheme comparison and selection

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5	北京通州交通枢纽灌注支盘桩设计方案比选	20201703039	张博业	I2105

桩基础是设置在地基中主要承担荷载作用的基础部件。在大部分高层建筑、桥梁、港口等结构中得到了大范围应用，是保障工程结构安全、性能可靠的重要一环，也是土木工程中不断探索和设计的新技术领域。本文以通州交通枢纽灌注支盘桩的桩基设计作为研究对象，为获得更加合理的桩基方案，将支盘桩这一桩型应用于灌注桩中。与同直径的常规桩相比，该桩型具有桩长可以有效缩短、桩基承载力大幅提升的优点。结合场地岩土工程初步勘察报告，参照规范要求确定桩型、持力层，设计桩体几何尺寸和埋深，确定支盘尺寸，并开展单桩承载力验算和承台稳定性分析、柱冲切和角桩冲切、抗剪等多项力学验算。在完成支盘桩方案设计后，采用同样的方法设计同项目条件下直径、长度与支盘桩相同的常规桩方案。最后对两者进行方案造价估算和对比，总结支盘桩和常规桩两种设计方案的技术经济性，为实际工程中桩基础方案的选择提供依据。

关键词：桩基础，支盘桩，桩承台验算，稳定性，设计

Pile foundation is a structural component embedded in the ground that primarily bears loads. Widely applied in high-rise buildings, bridges, port structures, and other engineering projects, it serves as a crucial element ensuring structural safety and reliable performance, while also representing an innovative technological field in civil engineering. This paper focuses on the pile foundation design of bored branch and disk piles for Tongzhou Transportation Hub. To achieve a more rational pile foundation solution, the branch and disk pile configuration is implemented in bored piles. Compared with conventional piles of equivalent diameter, this pile type demonstrates advantages in significantly reducing required pile length while substantially enhancing bearing capacity.

Based on preliminary geotechnical investigation reports and code requirements, the study determines pile type and bearing stratum, designs pile geometry and embedment depth, specifies branch and disk dimensions, and conducts multiple mechanical verifications including single pile bearing capacity assessment, pile cap stability analysis, column punching shear, corner pile punching shear, and shear resistance checks. Following the completion of branch and disk pile design, a conventional pile scheme with identical diameter and length under equivalent project conditions is developed using the same methodology. Finally, cost estimations and comparisons between both schemes are performed to summarize the technical-economic characteristics of branch and disk piles versus conventional piles, thereby providing decision-making references for practical pile foundation selection in engineering projects.
Key Words： Pile foundation, Branch and disk piles, Pile cap verification, Stability, Design