

UNIT 46 TENDERING AND ESTIMATING IN CONSTRUCTION Updated Version

Unit 46 Tendering and Estimating in Construction: A Comprehensive Guide

Unit 46 tendering and estimating in construction is a critical component of successful project management within the construction industry. It involves the processes of preparing detailed cost estimates and submitting competitive tenders to secure construction contracts. Mastery of these skills ensures that projects are financially viable and profitable while meeting client specifications and industry standards. This article provides an in-depth overview of tendering and estimating in construction, focusing on key concepts, methodologies, and best practices to excel in this specialized area.

Understanding Tendering in Construction

Tendering is the process through which contractors submit proposals to undertake construction work at a specified price. It is a vital step in the procurement process, enabling clients to select the most suitable contractor based on cost, experience, and capability.

Types of Tendering

- Open Tendering: Publicly advertised tenders accessible to all interested contractors. Promotes transparency and competition.
- Selective Tendering: Invitations sent to a select group of pre-qualified contractors. Ensures quality and reliability.
- Negotiated Tendering: Direct negotiation with a single contractor, often used for specialized or urgent projects.
- Competitive Tendering: Contractors compete by submitting sealed bids, with the lowest or most suitable tender winning.

Stages of the Tendering Process

- Pre-qualification: Assessing contractor capabilities and experience.
- Invitation to Tender: Distributing tender documents to pre-qualified contractors.
- Site Visit and Clarifications: Ensuring all bidders understand the project scope.
- Submission of Tenders: Contractors prepare and submit their bids.

- Tender Opening and Evaluation: Reviewing bids for compliance and competitiveness.
- Contract Award: Negotiating and signing the contract with the selected bidder.

Estimating in Construction

Estimating is the process of calculating the approximate cost of a construction project. Accurate estimates are vital for setting realistic budgets, securing funding, and ensuring project profitability.

Types of Construction Estimates

- Order of Magnitude Estimate: Rough estimate based on limited information, typically used in early project stages.
- Preliminary Estimate: More refined, based on initial design data.
- Detailed Estimate: Comprehensive, including detailed quantities and costs for all elements.
- Final Estimate: Used for project approval and financial planning before construction begins.

Key Components of Construction Estimating

- Quantity Takeoff: Accurate measurement of materials and quantities from drawings.
- Unit Pricing: Assigning current market rates to each quantity.
- Labor Costs: Estimating wages, benefits, and productivity for the workforce.
- Material Costs: Calculating based on supplier prices and market trends.
- Equipment Costs: Rental, operation, and maintenance expenses.
- Overheads and Profit: Indirect costs and desired profit margins.

Core Techniques in Tendering and Estimating

Quantity Surveying and Cost Planning

- Systematic measurement of quantities from drawings.
- Developing cost plans aligned with project scope and design.
- Using historical data and industry benchmarks for accuracy.

Breakdown Structures and Cost Coding

- Creating work breakdown structures (WBS) to organize estimates.
- Assigning cost codes for easier tracking and management.

Market Research and Supplier Engagement

- Gathering current material and labor prices.
- Building relationships with reliable suppliers and subcontractors.

Risk Assessment and Contingency Planning

- Identifying potential risks influencing costs.
- Incorporating contingency sums to mitigate uncertainties.

Best Practices for Effective Tendering and Estimating

- Thorough Documentation: Maintain detailed records of all calculations and sources.
- Continuous Market Analysis: Keep abreast of price fluctuations and industry trends.
- Use of Technology: Implement estimating software and digital tools for accuracy and efficiency.
- Clear Scope Definition: Ensure tender documents clearly specify project requirements.
- Competitive Pricing Strategies: Balance competitiveness with profitability.
- Early Site Involvement: Engage with clients and designers early for better understanding and risk mitigation.
- Review and Validation: Cross-check estimates and tender documents before submission.

Legal and Ethical Considerations in Tendering

- Adhere to procurement regulations and client requirements.
- Avoid collusion or fraudulent practices.
- Ensure transparency and fairness throughout the tender process.
- Respect intellectual property rights of drawings and specifications.

Challenges in Tendering and Estimating

- Fluctuating material costs and labor rates.
- Incomplete or unclear project documentation.
- Tight deadlines leading to rushed estimates.
- Competitive bidding pressures that can compromise profitability.
- Managing risks associated with unforeseen site conditions.

Conclusion

Mastering unit 46 tendering and estimating in construction is essential for professionals aiming to excel in construction project management. It involves a combination of technical skills, market knowledge, strategic thinking, and ethical standards. By understanding the different tendering methods, employing accurate estimating techniques, and following best practices, contractors can improve their chances of winning profitable projects while maintaining quality and compliance. Staying updated with industry trends and leveraging technology further enhances efficiency and accuracy in this vital aspect of construction management.

Keywords: Unit 46, tendering in construction, estimating in construction, construction tender process, cost estimation, quantity surveying, bid preparation, construction project management, tendering techniques, estimating software, construction costs, project budgeting

Unit 46 Tendering and Estimating in Construction: A Comprehensive Overview

Introduction

Unit 46 Tendering and Estimating in Construction forms the backbone of successful project delivery in the construction industry. It encompasses the systematic processes of preparing detailed cost estimates and securing work through competitive tendering. Mastery of these elements is essential for contractors aiming to win profitable projects while maintaining competitive advantage. This article explores the critical aspects of tendering and estimating, highlighting best practices, industry standards, and the strategic importance of each stage to ensure project success.

Understanding Tendering and Estimating in Construction

What is Estimating?

Estimating is the initial phase where detailed calculations are made to predict the cost of a construction project. It involves analyzing project specifications, drawings, and scope to produce an accurate financial forecast. Accurate estimating allows contractors to:

- Determine the feasibility of a project
- Set competitive yet profitable bid prices
- Manage project budgets effectively once awarded

What is Tendering?

Tendering is the process of inviting bids from contractors to undertake a project. It involves

preparing tender documentation, submitting competitive offers, and negotiating terms. The goal is to secure contracts at the most favorable terms while ensuring quality and compliance.

Interrelation of Estimating and Tendering

While distinct stages, estimating and tendering are tightly interconnected. Precise estimates inform competitive bids, and successful tendering depends on the accuracy and completeness of estimates. Errors or omissions in estimates can lead to financial losses or project delays, emphasizing the importance of rigorous processes.

The Estimating Process: A Step-by-Step Breakdown

- Reviewing Tender Documentation

Before estimating begins, comprehensive analysis of the tender documents is essential. This includes:

- Project drawings and specifications
- Bill of Quantities (BoQ) or Schedule of Rates
- Contract conditions
- Site information and access considerations

Understanding the client's requirements and project constraints sets the foundation for accurate costing.

- Quantity Take-Off

This involves measuring and listing all materials, labor, and equipment needed for the project. Techniques include:

- Manual measurement from drawings
- Using software tools for digital take-offs
- Identifying potential variations or uncertainties

Accurate quantity take-offs are crucial as they directly impact cost estimates.

- Costing Materials and Resources

Once quantities are established, the next step is assigning costs:

- Material prices (considering procurement sources)
- Labor rates based on wage standards
- Equipment hire or purchase costs
- Subcontractor quotes

Sources such as supplier catalogs, historical data, and market surveys inform these costs.

- Applying Overheads and Profit Margins

Overheads cover indirect costs like office expenses, insurance, and project management. Profit margins are added to ensure the project's financial viability. Calculations include:

- Overheads as a percentage of direct costs
- Contingency allowances for unforeseen circumstances
- Desired profit margins based on market conditions

- Preparing the Estimate Document

The final estimate consolidates all cost elements into a clear, detailed document. It often includes:

- Breakdown of costs by work packages
- Assumptions and exclusions
- Summary of total project cost

This document serves as the basis for tender submission and future project control.

Tendering Strategies and Processes in Construction

Types of Tendering

Construction projects typically employ various tendering methods, each with its advantages:

- Open Tendering: Public invitation for bids, promoting transparency and competition.
- Selective Tendering: Invitation to a select group of qualified contractors, ensuring quality and reliability.
- Negotiated Tendering: Direct negotiations with a preferred contractor, suitable for complex or confidential projects.

Preparing the Tender Submission

Key components include:

- Completed tender forms
- Cost estimates and pricing schedules
- Technical proposals and methodology
- Compliance documentation and certifications

Precise and professional presentation enhances credibility and competitiveness.

Tender Evaluation and Awarding

Post-submission, clients evaluate tenders based on:

- Price competitiveness
- Contractor's experience and reputation
- Proposed methodology
- Compliance with specifications and contractual terms

The winning tender balances cost, quality, and risk considerations.

Critical Factors Influencing Tendering and Estimating Success

Accurate Data and Market Intelligence

Reliable data ensures estimates reflect current market conditions. Factors include:

- Fluctuating material prices
- Labor availability and wages
- Equipment costs
- Supplier and subcontractor reliability

Regular market analysis helps in adjusting estimates accordingly.

Risk Management

Identifying potential risks such as site challenges, design changes, or regulatory delays is vital. Incorporating contingency sums and flexible planning mitigates financial exposure.

Effective Cost Control and Budgeting

Throughout the project, ongoing cost monitoring against estimates ensures profitability. Proper estimation facilitates setting realistic budgets and managing cash flows.

Legal and Contractual Knowledge

Understanding contractual obligations and procurement laws influences tendering strategies and risk assessment.

The Role of Technology in Modern Tendering and Estimating

Estimating Software

Tools like CostX, Bluebeam, and Planswift streamline quantity take-offs and cost calculations, increasing accuracy and efficiency.

Building Information Modeling (BIM)

BIM enables 3D modeling of project components, facilitating precise quantity extraction and clash detection, reducing errors.

Digital Tender Platforms

Online portals simplify tender distribution, submission, and evaluation, expanding reach and transparency.

Challenges and Best Practices

Common Challenges

- Incomplete or inaccurate project information
- Market volatility affecting prices

- Underestimating risks or contingencies
- Tight deadlines impacting quality of bids

Best Practices

- Conduct detailed site and project analysis
- Maintain updated cost databases and market intelligence
- Adopt standardized estimation procedures
- Foster collaborative relationships with suppliers and subcontractors
- Implement quality checks and peer reviews of estimates

Strategic Importance of Effective Tendering and Estimating

Successful tendering and estimating directly influence a company's profitability and reputation. Accurate estimates lead to winning projects at fair profits, while effective tendering ensures competitiveness and market positioning. Conversely, poor estimation can result in financial losses, project delays, or damage to client relationships. Therefore, investing in skilled personnel, technology, and process refinement is essential for sustained success.

Conclusion

Unit 46 Tendering and Estimating in Construction encapsulates a vital area of construction management that requires a blend of technical skill, industry knowledge, and strategic insight. As markets evolve and project complexities increase, firms must adopt rigorous, data-driven, and innovative approaches to stay ahead. Mastering these processes not only enhances the likelihood of securing profitable contracts but also builds a foundation for delivering high-quality projects that meet client expectations and industry standards. In an increasingly competitive landscape, excellence in tendering and estimating is a key differentiator that can determine long-term success in the construction industry.

Question What are the key steps involved in the tendering process in construction? The key steps include preparing the tender documents, issuing the tender to potential contractors, receipt and evaluation of bids, and finally awarding the contract to the most suitable bidder. How does accurate estimating impact the success of a construction tender? Accurate estimating ensures competitive pricing, helps avoid cost overruns, and increases the chances of winning the tender while maintaining profitability. What are common methods used for construction cost estimation in Unit 46? Common methods include detailed quantity take-offs, unit rate analysis, parametric estimating, and analogous estimating based on similar projects. How can technology improve tendering and estimating processes in construction? Technology such as Building Information Modeling (BIM), estimating software, and digital collaboration platforms enhance accuracy,

efficiency, and streamline communication during tendering and estimating. What are the main factors that influence the accuracy of construction estimates? Factors include completeness of project scope, quality of cost data, experience of estimators, site conditions, and market fluctuations in material and labor costs. Why is risk assessment important in the tendering process? Risk assessment helps identify potential issues that could affect project costs or timelines, enabling better decision-making and the inclusion of appropriate contingencies in the bid. What role does value engineering play in Unit 46 tendering and estimating? Value engineering involves analyzing project components to optimize functionality and reduce costs without compromising quality, thereby making tenders more competitive. How do legal and contractual considerations influence tendering in construction projects? Legal and contractual considerations ensure that bids comply with regulations, protect parties' interests, and set clear terms, which are crucial for the smooth execution and enforceability of contracts.

Related keywords: construction tendering, construction estimating, bid preparation, project cost estimation, construction procurement, tender process, construction bids, estimating software, contract bidding, construction project management

Building Construction University Of Delaware

Building Construction University of Delaware is a prominent program that prepares students for diverse careers in the construction and building industry. Known for its rigorous curriculum, experienced faculty, and state-of-the-art facilities, this program offers a comprehensive education designed to meet the evolving demands of the construction sector. Whether you're interested in project management, sustainable building practices, or structural engineering, the Building Construction program at the University of Delaware provides a solid foundation for professional success. This article explores the key aspects of the program, including academic offerings, faculty expertise, facilities, career opportunities, and why it stands out as a top choice for aspiring construction professionals.

Overview of Building Construction Program at the University of Delaware

The Building Construction program at the University of Delaware is part of the College of Engineering and the College of Arts and Sciences, offering undergraduate and graduate degrees tailored to meet industry needs. The program emphasizes hands-on learning, technical proficiency, and leadership skills to prepare students for real-world challenges.

Academic Degrees Offered

- Bachelor of Science in Building Construction Management
- Master of Science in Building Construction and Facility Management
- Certificate programs in specialized areas such as sustainable construction and project management

Program Goals and Objectives

- Develop technical knowledge in construction methods, materials, and systems
- Foster leadership and management skills for construction projects
- Promote sustainable and environmentally responsible building practices
- Prepare students for certification exams such as OSHA, LEED, and PMP
- Engage students in industry internships and cooperative education (co-op) opportunities

Curriculum and Course Highlights

The curriculum is designed to combine theoretical knowledge with practical application. Courses are structured to build foundational skills before progressing to advanced topics.

Core Courses

- Construction Materials and Methods
- Structural Analysis and Design
- Construction Project Management
- Estimating and Cost Control
- Construction Safety and Risk Management
- Sustainable Building Practices

Electives and Specializations

Students can select electives based on their career interests, including:

- Building Information Modeling (BIM)
- Green Building Technologies
- Construction Law and Contracts
- Quality Assurance and Control
- Advanced Project Scheduling

Capstone and Practical Experience

- Final year capstone projects involve real-world construction challenges
- Industry internships and co-op programs provide hands-on experience
- Collaboration with local construction firms for site visits and project simulations

Faculty and Industry Experts

The success of the Building Construction program is largely attributed to its faculty, who bring a wealth of industry experience and academic expertise.

Faculty Expertise

- Professors with backgrounds in civil engineering, architecture, and construction management
- Industry practitioners who regularly consult and collaborate with students
- Researchers focusing on sustainable construction practices, innovative building materials, and construction safety

Industry Partnerships

- Collaboration with leading construction firms and industry organizations
- Opportunities for mentorship, internships, and job placements
- Participation in industry conferences and seminars hosted by the university

State-of-the-Art Facilities and Resources

The University of Delaware invests heavily in providing students with modern facilities that mirror real-world construction environments.

Construction Labs and Workshops

- Fully equipped labs for materials testing and structural analysis
- Model construction sites for hands-on learning
- Workshops for developing skills in carpentry, framing, and finishing

Building Information Modeling (BIM) Labs

- Advanced software tools for digital modeling and project simulation
- Training in 3D modeling, clash detection, and construction sequencing

Library and Research Resources

- Access to extensive technical journals, industry reports, and standards
- Dedicated research centers focusing on sustainable construction and engineering innovations

Career Opportunities and Industry Connections

Graduates of the Building Construction program at the University of Delaware are well-positioned for successful careers across the construction industry.

Potential Career Paths

- Construction Project Manager
- Estimator and Cost Analyst
- Construction Safety Officer
- Building Inspector
- Sustainability Consultant
- Facilities Manager
- Construction Engineer

Job Placement and Support Services

- Career counseling and resume workshops
- On-campus recruiting events and job fairs
- Alumni network for mentorship and industry connections
- Internship and co-op placement assistance

Accreditation and Industry Recognition

The program is accredited by reputable organizations, ensuring academic quality and industry relevance.

Accrediting Bodies

- ABET (Accreditation Board for Engineering and Technology)
- The Construction Management Association of America (CMAA)
- LEED Certification Providers for sustainable building curricula

Industry Recognition

- High employment rates among graduates
- Recognition from industry leaders for curriculum excellence
- Continuous curriculum updates aligned with industry standards

Why Choose Building Construction at the University of Delaware?

Selecting the right program is crucial for future success. Here are some reasons why the University of Delaware's Building Construction program stands out:

- **Strong Industry Connections:** Partnerships with leading firms ensure internships, mentorships, and job placements.
- **Hands-On Learning:** Practical experience through labs, workshops, and real-world projects.
- **Research Opportunities:** Engage in innovative research on sustainable construction and new materials.
- **Location Advantage:** Situated in a region with a vibrant construction industry, providing ample project opportunities.
- **Alumni Network:** Access to a network of successful professionals across the construction sector.

Conclusion

The Building Construction University of Delaware program offers a comprehensive pathway for students aspiring to excel in the construction industry. Combining rigorous academics, practical experience, industry partnerships, and cutting-edge facilities, it prepares graduates to meet the challenges of modern construction projects. Whether you aim to become a project manager, estimator, or sustainability expert, this program provides the tools, knowledge, and connections necessary for a successful career. For those seeking a top-tier education in building construction, the University of Delaware stands out as a premier choice to turn your ambitions into reality.

Keywords: Building Construction University of Delaware, construction management program, construction degrees Delaware, sustainable building practices, construction industry careers, University of Delaware construction facilities, ABET accredited construction program, career in construction Delaware, Building Construction faculty Delaware, construction internships University of Delaware

Building Construction at the University of Delaware: Pioneering Education and Innovation in the Field

Building construction is a vital discipline that bridges the gap between engineering, architecture, and project management. It shapes the physical environment we live in, ensuring safety, sustainability, and efficiency in the built environment. The University of Delaware (UD) has established itself as a prominent institution in this domain, offering comprehensive programs, cutting-edge research, and industry collaborations that prepare students to excel in the ever-evolving construction industry.

Building construction university of delaware stands out as a hub for academic excellence, practical training, and innovative research, making it a top choice for aspiring construction professionals.

In this article, we delve into the various facets of building construction at the University of Delaware, exploring academic programs, research initiatives, industry partnerships, facilities, and career prospects. Whether you're a prospective student, industry stakeholder, or simply interested in the future of construction education, this detailed overview provides valuable insights into how UD is shaping the next generation of construction experts.

Overview of Building Construction at the University of Delaware

The University of Delaware's approach to building construction emphasizes a multidisciplinary curriculum designed to equip students with technical skills, managerial capabilities, and a strong foundation in sustainable practices. The program integrates classroom learning with real-world applications through labs, internships, and collaborative projects.

The Department of Civil and Environmental Engineering at UD oversees the construction program, emphasizing hands-on learning and research that addresses current industry challenges. The university's commitment to innovation is reflected in its investment in state-of-the-art facilities and active industry collaborations.

Academic Programs and Curriculum

Bachelor's Degree in Construction Engineering and Management

The undergraduate program aims to produce graduates capable of managing complex construction projects from inception to completion. Key components include:

- Core Courses: Structural analysis, construction materials, project management, construction safety, and estimating.
- Electives: Sustainable construction, Building Information Modeling (BIM), and advanced project planning.
- Practical Experience: Opportunities for internships, co-op programs, and industry site visits.

Students are encouraged to develop skills in leadership, communication, and problem-solving, vital for managing diverse teams and projects.

Master's and Ph.D. Programs

Advanced degrees focus on research and specialization in areas such as construction automation, digital construction technologies, and resilient infrastructure. These programs foster innovation and prepare students for leadership roles in academia.

- Master's in Civil Engineering (Construction Emphasis): Combines coursework with thesis research.
- Doctoral Studies: Focused on cutting-edge research, often in collaboration with industry partners.

State-of-the-Art Facilities and Labs

The University of Delaware invests heavily in facilities that support hands-on learning and research:

- Construction Laboratory: Equipped with tools and equipment for testing construction materials and techniques.
- BIM and Digital Modeling Labs: Facilities dedicated to Building Information Modeling, virtual construction simulations, and digital twin technology.
- Robotics and Automation Labs: Supporting research in construction automation and innovative construction methods.
- Sustainable Construction Facilities: Focused on green building practices, renewable materials, and energy-efficient construction.

These facilities enable students to gain practical experience and conduct pioneering research that addresses industry needs.

Research Initiatives and Industry Collaboration

UD's building construction program is distinguished by its robust research portfolio, addressing critical issues such as:

- Sustainable Building Practices: Developing eco-friendly materials, energy-efficient systems, and waste reduction techniques.
- Construction Safety: Innovating safety protocols and hazard mitigation strategies.

- Digital Construction Technologies: Advancing BIM, augmented reality, and automation in construction workflows.
- Resilient Infrastructure: Designing structures capable of withstanding extreme weather events and climate change impacts.

The university maintains active partnerships with industry leaders like Skanska, Turnpike Construction, and local government agencies. These collaborations facilitate internships, sponsored research, and real-world problem-solving opportunities for students.

Industry Engagement and Career Development

Preparing students for the workforce is a cornerstone of UD's building construction program. The university offers:

- Internship and Co-op Programs: Ties with construction firms provide students with hands-on experience.
- Career Fairs and Networking Events: Connecting students with industry recruiters and alumni.
- Professional Development Workshops: Covering topics like project management software, safety standards, and leadership skills.
- Certification Support: Assistance with obtaining certifications such as OSHA, LEED, and PMP.

Graduates from UD's construction programs are highly sought after, finding employment in general contracting, project management, design-build firms, and government agencies. The program's emphasis on sustainability and digital technology positions students as forward-thinking professionals equipped to lead in modern construction environments.

Sustainability and Green Building Focus

In line with global trends toward sustainable development, the University of Delaware's building construction curriculum integrates environmental considerations into all facets of education. Initiatives include:

- Green Building Certifications: Courses prepare students for LEED accreditation.
- Research in Renewable Materials: Exploring alternatives to traditional construction materials.
- Energy-efficient Design: Incorporating passive heating, cooling, and renewable energy sources.
- Environmental Impact Assessments: Teaching students to evaluate and minimize construction footprints.

This focus ensures graduates are not only skilled builders but also stewards of sustainable

development.

Future Directions and Innovations

Looking ahead, the university aims to incorporate emerging technologies and methodologies into its programs:

- Digital Twins: Creating virtual replicas of construction projects for planning and maintenance.
- Autonomous Construction Equipment: Research into robot-assisted building processes.
- Smart Cities Integration: Preparing students to work within interconnected urban environments.
- Resilience and Climate Adaptation: Designing infrastructure to withstand future environmental challenges.

By maintaining a forward-looking curriculum and research agenda, the University of Delaware continues to be a leader in building construction education.

Conclusion

Building construction at the University of Delaware exemplifies a comprehensive, innovative approach to preparing students for the complexities of modern infrastructure development. Through a blend of rigorous academics, cutting-edge research, industry partnerships, and a focus on sustainability, UD equips its graduates with the skills needed to shape the future of construction. As the industry evolves with new technologies and environmental demands, the university remains committed to fostering a new generation of construction professionals capable of leading through innovation and responsibility.

Whether you're considering a career in construction or seeking a partner for research and development, the University of Delaware's building construction program stands out as a beacon of excellence and innovation in the field.

Question What programs does the University of Delaware offer in building construction? The University of Delaware offers undergraduate and graduate programs in Construction Management and Civil Engineering, focusing on building construction, project management, and sustainable building practices. **Does the University of Delaware have a dedicated building construction research center?** Yes, the University of Delaware hosts the Center for Building Innovation, which conducts research on sustainable construction methods, new building materials, and construction technology. **Are there internship opportunities for students in building construction at the University of Delaware?** Absolutely. The university collaborates with industry partners to provide students with internships and co-op programs in construction firms, helping them gain real-world experience. **What facilities are available for building construction students at the**

University of Delaware? Students have access to state-of-the-art labs, simulation centers, and fabrication workshops, including the Construction Management Lab equipped with the latest construction software and tools. Is the building construction program at the University of Delaware accredited? Yes, the Construction Management program is accredited by ABET, ensuring high standards of quality and industry relevance. What career paths are available for graduates of the building construction program at the University of Delaware? Graduates can pursue careers in construction management, project engineering, estimating, site supervision, and sustainable building design in both private and public sectors.

Related keywords: building construction, University of Delaware, civil engineering, construction management, architecture program, Delaware engineering schools, construction technology, university construction courses, building sciences, Delaware architecture programs

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