

WHOLE BUILDING DESIGN GUIDE UFC

WHOLE BUILDING DESIGN GUIDE UFC IS AN ESSENTIAL RESOURCE FOR ARCHITECTS, ENGINEERS, AND CONSTRUCTION PROFESSIONALS INVOLVED IN FEDERAL PROJECTS. THIS COMPREHENSIVE GUIDE INTEGRATES PRINCIPLES OF SUSTAINABLE DESIGN, ENERGY EFFICIENCY, AND FACILITY MANAGEMENT TO ENSURE BUILDINGS MEET STRINGENT UFC (UNIFIED FACILITIES CRITERIA) STANDARDS. UNDERSTANDING THE WHOLE BUILDING DESIGN APPROACH OUTLINED IN THE UFC IS CRUCIAL FOR CREATING STRUCTURES THAT ARE NOT ONLY FUNCTIONAL AND DURABLE BUT ALSO ENVIRONMENTALLY RESPONSIBLE AND COST-EFFECTIVE OVER THEIR LIFECYCLE. THIS ARTICLE DELVES INTO THE KEY COMPONENTS OF THE WHOLE BUILDING DESIGN GUIDE UFC, EXPLORING ITS APPLICATION, BENEFITS, AND BEST PRACTICES FOR COMPLIANCE. ADDITIONALLY, IT HIGHLIGHTS THE RELATIONSHIP BETWEEN UFC STANDARDS AND CONTEMPORARY DESIGN METHODOLOGIES THAT EMPHASIZE INTEGRATED PROJECT DELIVERY AND LIFECYCLE PERFORMANCE. THE FOLLOWING SECTIONS PROVIDE A DETAILED OVERVIEW OF THE GUIDE'S FRAMEWORK, CRITERIA, AND IMPLEMENTATION STRATEGIES FOR FEDERAL BUILDING PROJECTS.

- OVERVIEW OF WHOLE BUILDING DESIGN GUIDE UFC
- KEY PRINCIPLES AND CRITERIA IN UFC
- INTEGRATION OF SUSTAINABILITY AND ENERGY EFFICIENCY
- DESIGN PROCESS AND PROJECT DELIVERY METHODS
- COMPLIANCE AND PERFORMANCE EVALUATION

OVERVIEW OF WHOLE BUILDING DESIGN GUIDE UFC

THE WHOLE BUILDING DESIGN GUIDE UFC SERVES AS A CENTRALIZED MANUAL FOR DESIGNING AND CONSTRUCTING FEDERAL FACILITIES THAT COMPLY WITH THE UNIFIED FACILITIES CRITERIA. IT CONSOLIDATES VARIOUS STANDARDS, BEST PRACTICES, AND TECHNICAL REQUIREMENTS INTO A COHESIVE FRAMEWORK THAT PROMOTES HOLISTIC BUILDING DESIGN. THE UFC ADDRESSES DIVERSE ASPECTS INCLUDING ARCHITECTURAL DESIGN, STRUCTURAL INTEGRITY, MECHANICAL AND ELECTRICAL SYSTEMS, AND SITE PLANNING. BY ADHERING TO THIS GUIDE, PROJECT TEAMS ENSURE THAT BUILDINGS MEET FEDERAL MANDATES FOR SAFETY, ACCESSIBILITY, AND ENVIRONMENTAL STEWARDSHIP. THE GUIDE IS PERIODICALLY UPDATED TO REFLECT ADVANCES IN BUILDING TECHNOLOGIES AND EVOLVING REGULATORY REQUIREMENTS, MAKING IT A DYNAMIC TOOL FOR FEDERAL CONSTRUCTION PROFESSIONALS.

PURPOSE AND SCOPE OF UFC

THE UFC ESTABLISHES MANDATORY CRITERIA AND GUIDANCE FOR THE PLANNING, DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE OF MILITARY AND OTHER FEDERAL FACILITIES. ITS SCOPE ENCOMPASSES ALL PHASES OF A BUILDING'S LIFECYCLE TO PROMOTE OPTIMAL PERFORMANCE AND COST SAVINGS. THE WHOLE BUILDING DESIGN GUIDE UFC EMPHASIZES INTEGRATED DESIGN APPROACHES THAT COORDINATE MULTIPLE DISCIPLINES TO ACHIEVE PROJECT OBJECTIVES EFFICIENTLY. THIS ENSURES THAT FACILITIES ARE BUILT TO WITHSTAND OPERATIONAL DEMANDS WHILE MINIMIZING ENVIRONMENTAL IMPACT AND RESOURCE CONSUMPTION.

TARGET AUDIENCE AND USAGE

THE GUIDE IS PRIMARILY INTENDED FOR ARCHITECTS, ENGINEERS, CONTRACTORS, AND FACILITY MANAGERS INVOLVED IN FEDERAL PROJECTS. IT SUPPORTS COMPLIANCE WITH FEDERAL REQUIREMENTS SUCH AS ENERGY CODES, SAFETY REGULATIONS, AND SUSTAINABILITY MANDATES. BY UTILIZING THE WHOLE BUILDING DESIGN GUIDE UFC, STAKEHOLDERS CAN STREAMLINE PROJECT DELIVERY, REDUCE RISKS, AND ENHANCE BUILDING FUNCTIONALITY. IT SERVES AS A REFERENCE THROUGHOUT THE PROJECT LIFECYCLE, FROM INITIAL CONCEPT DEVELOPMENT THROUGH COMMISSIONING AND FACILITY MANAGEMENT.

KEY PRINCIPLES AND CRITERIA IN UFC

THE WHOLE BUILDING DESIGN GUIDE UFC IS GROUNDED IN SEVERAL FUNDAMENTAL PRINCIPLES THAT GUIDE DESIGN DECISIONS AND PROJECT EXECUTION. THESE PRINCIPLES ENSURE THAT FEDERAL BUILDINGS DELIVER LONG-TERM VALUE WHILE ADHERING TO REGULATORY STANDARDS. THE GUIDE INCORPORATES CRITERIA THAT ADDRESS STRUCTURAL PERFORMANCE, SAFETY, ACCESSIBILITY, DURABILITY, AND ENVIRONMENTAL IMPACT. EMPHASIS IS PLACED ON CREATING RESILIENT BUILDINGS THAT CAN ADAPT TO CHANGING OPERATIONAL NEEDS AND CLIMATIC CONDITIONS.

SAFETY AND SECURITY STANDARDS

UFC MANDATES STRICT SAFETY REQUIREMENTS TO PROTECT OCCUPANTS AND ASSETS. THIS INCLUDES PROVISIONS FOR FIRE PROTECTION, NATURAL DISASTER RESISTANCE, AND SECURITY MEASURES AGAINST POTENTIAL THREATS. THE WHOLE BUILDING DESIGN GUIDE UFC OUTLINES SPECIFIC DESIGN STRATEGIES FOR MITIGATING RISKS SUCH AS BLAST RESISTANCE, INTRUSION DETECTION, AND EMERGENCY EGRESS ROUTES. COMPLIANCE WITH THESE STANDARDS IS CRITICAL FOR ENSURING THE SAFETY OF PERSONNEL AND MISSION CONTINUITY.

ACCESSIBILITY AND UNIVERSAL DESIGN

THE GUIDE REQUIRES ADHERENCE TO ACCESSIBILITY STANDARDS THAT ACCOMMODATE INDIVIDUALS WITH DISABILITIES. UNIVERSAL DESIGN PRINCIPLES ARE INTEGRATED TO CREATE INCLUSIVE ENVIRONMENTS THAT SUPPORT DIVERSE USER NEEDS. THIS INCLUDES REQUIREMENTS FOR BARRIER-FREE ACCESS, APPROPRIATE SIGNAGE, AND ERGONOMIC CONSIDERATIONS THAT ENHANCE USABILITY THROUGHOUT FEDERAL FACILITIES.

DURABILITY AND MAINTAINABILITY

DESIGNING FOR DURABILITY INVOLVES SELECTING MATERIALS AND SYSTEMS THAT WITHSTAND OPERATIONAL WEAR AND ENVIRONMENTAL EXPOSURE OVER EXTENDED PERIODS. THE WHOLE BUILDING DESIGN GUIDE UFC PROMOTES MAINTAINABILITY BY ENCOURAGING DESIGNS THAT FACILITATE EASY INSPECTION, REPAIR, AND REPLACEMENT. THIS REDUCES LIFECYCLE COSTS AND EXTENDS BUILDING SERVICE LIFE.

INTEGRATION OF SUSTAINABILITY AND ENERGY EFFICIENCY

SUSTAINABILITY IS A CORE COMPONENT OF THE WHOLE BUILDING DESIGN GUIDE UFC, REFLECTING FEDERAL MANDATES TO REDUCE ENVIRONMENTAL IMPACT AND PROMOTE ENERGY CONSERVATION. THE GUIDE PROVIDES CRITERIA FOR INCORPORATING GREEN BUILDING TECHNOLOGIES, RENEWABLE ENERGY SOURCES, AND EFFICIENT RESOURCE MANAGEMENT INTO FEDERAL PROJECTS. THIS HOLISTIC APPROACH ALIGNS WITH BROADER GOVERNMENT INITIATIVES SUCH AS EXECUTIVE ORDERS ON SUSTAINABILITY AND ENERGY REDUCTION TARGETS.

ENERGY PERFORMANCE AND MODELING

THE UFC REQUIRES COMPREHENSIVE ENERGY ANALYSIS AND MODELING TO OPTIMIZE BUILDING SYSTEMS FOR REDUCED CONSUMPTION. THIS INCLUDES HVAC EFFICIENCY, LIGHTING CONTROLS, AND BUILDING ENVELOPE PERFORMANCE. THE WHOLE BUILDING DESIGN GUIDE UFC ENCOURAGES THE USE OF ADVANCED SIMULATION TOOLS TO PREDICT ENERGY USE AND IDENTIFY COST-EFFECTIVE IMPROVEMENTS DURING THE DESIGN PHASE.

WATER CONSERVATION AND WASTE REDUCTION

WATER EFFICIENCY MEASURES ARE INTEGRATED INTO BUILDING DESIGN TO MINIMIZE CONSUMPTION AND SUPPORT SUSTAINABILITY GOALS. THE GUIDE OUTLINES STRATEGIES SUCH AS LOW-FLOW FIXTURES, RAINWATER HARVESTING, AND GREYWATER REUSE.

ADDITIONALLY, CONSTRUCTION WASTE MANAGEMENT PLANS ARE EMPHASIZED TO REDUCE LANDFILL CONTRIBUTIONS AND PROMOTE RECYCLING.

MATERIAL SELECTION AND ENVIRONMENTAL IMPACT

THE GUIDE ADVOCATES FOR THE USE OF ENVIRONMENTALLY PREFERABLE MATERIALS THAT HAVE LOW EMBODIED ENERGY AND MINIMAL TOXIC EMISSIONS. SUSTAINABLE SOURCING AND LIFECYCLE ASSESSMENT ARE KEY CONSIDERATIONS IN MATERIAL SELECTION. THE WHOLE BUILDING DESIGN GUIDE UFC ENCOURAGES SPECIFYING PRODUCTS WITH RECYCLED CONTENT AND CERTIFICATIONS SUCH AS FSC OR LEED EQUIVALENCIES.

DESIGN PROCESS AND PROJECT DELIVERY METHODS

THE WHOLE BUILDING DESIGN GUIDE UFC PROMOTES COLLABORATIVE PROJECT DELIVERY MODELS THAT INTEGRATE ALL STAKEHOLDERS FROM EARLY DESIGN THROUGH CONSTRUCTION AND HANDOVER. INTEGRATED PROJECT DELIVERY (IPD) AND DESIGN-BUILD ARE ENCOURAGED TO ENHANCE COMMUNICATION, REDUCE CONFLICTS, AND IMPROVE OVERALL PROJECT OUTCOMES. THE GUIDE OUTLINES BEST PRACTICES FOR COORDINATING MULTIDISCIPLINARY TEAMS AND LEVERAGING TECHNOLOGY FOR EFFICIENT WORKFLOW MANAGEMENT.

EARLY DESIGN INTEGRATION

ENGAGING ARCHITECTS, ENGINEERS, CONTRACTORS, AND FACILITY MANAGERS DURING THE CONCEPTUAL PHASE ENSURES ALIGNMENT WITH PROJECT GOALS AND UFC REQUIREMENTS. THE WHOLE BUILDING DESIGN GUIDE UFC STRESSES THE IMPORTANCE OF COLLABORATIVE WORKSHOPS, VALUE ENGINEERING, AND RISK ASSESSMENTS TO INFORM DESIGN DECISIONS EARLY. THIS PROACTIVE APPROACH MITIGATES COSTLY CHANGES AND SCHEDULE DELAYS LATER IN THE PROJECT.

COMMISSIONING AND QUALITY ASSURANCE

COMMISSIONING IS A CRITICAL STEP OUTLINED IN THE UFC TO VERIFY THAT BUILDING SYSTEMS PERFORM AS INTENDED. THE GUIDE DETAILS PROCEDURES FOR FUNCTIONAL TESTING, SYSTEM BALANCING, AND DOCUMENTATION REVIEW. QUALITY ASSURANCE PROCESSES ARE INTEGRATED THROUGHOUT CONSTRUCTION TO ENSURE COMPLIANCE WITH SPECIFICATIONS AND STANDARDS.

LIFECYCLE COST ANALYSIS

EVALUATING LIFECYCLE COSTS IS FUNDAMENTAL TO THE WHOLE BUILDING DESIGN GUIDE UFC APPROACH. THIS ANALYSIS CONSIDERS INITIAL CONSTRUCTION EXPENSES, OPERATION, MAINTENANCE, AND EVENTUAL DISPOSAL OR RENOVATION COSTS. INCORPORATING LIFECYCLE COST CONSIDERATIONS DURING DESIGN PROMOTES SUSTAINABLE INVESTMENTS AND FISCAL RESPONSIBILITY FOR FEDERAL AGENCIES.

COMPLIANCE AND PERFORMANCE EVALUATION

ENSURING COMPLIANCE WITH THE WHOLE BUILDING DESIGN GUIDE UFC INVOLVES RIGOROUS DOCUMENTATION, INSPECTIONS, AND PERFORMANCE MONITORING. THE GUIDE ESTABLISHES BENCHMARKS AND METRICS THAT FACILITATE ONGOING EVALUATION OF BUILDING EFFECTIVENESS. FEDERAL AGENCIES UTILIZE THESE MEASURES TO VALIDATE THAT FACILITIES MEET OPERATIONAL EXPECTATIONS AND REGULATORY REQUIREMENTS.

DOCUMENTATION AND REPORTING REQUIREMENTS

THE UFC MANDATES DETAILED RECORDKEEPING OF DESIGN DECISIONS, MATERIAL CERTIFICATIONS, AND TESTING RESULTS. THIS DOCUMENTATION SUPPORTS ACCOUNTABILITY AND FACILITATES FUTURE AUDITS OR RENOVATIONS. THE WHOLE BUILDING DESIGN GUIDE UFC PROVIDES TEMPLATES AND GUIDELINES FOR CONSISTENT REPORTING ACROSS PROJECTS.

POST-OCCUPANCY EVALUATION AND FEEDBACK

POST-OCCUPANCY EVALUATIONS ARE RECOMMENDED TO ASSESS OCCUPANT SATISFACTION, ENERGY USE, AND SYSTEM PERFORMANCE. FEEDBACK GATHERED INFORMS CONTINUOUS IMPROVEMENT EFFORTS AND HELPS REFINE UFC CRITERIA FOR FUTURE PROJECTS. THIS DATA-DRIVEN APPROACH ENHANCES THE EFFECTIVENESS OF WHOLE BUILDING DESIGN PRACTICES.

CONTINUOUS IMPROVEMENT AND UPDATES

THE UFC IS PERIODICALLY REVISED BASED ON TECHNOLOGICAL ADVANCES, REGULATORY CHANGES, AND LESSONS LEARNED FROM COMPLETED PROJECTS. THE WHOLE BUILDING DESIGN GUIDE UFC SUPPORTS A CULTURE OF CONTINUOUS IMPROVEMENT, ENCOURAGING FEDERAL AGENCIES AND DESIGN TEAMS TO STAY CURRENT WITH EVOLVING STANDARDS AND INNOVATIONS.

- ENHANCED BUILDING SAFETY AND RESILIENCE
- IMPROVED ENERGY EFFICIENCY AND SUSTAINABILITY
- STREAMLINED PROJECT DELIVERY AND COLLABORATION
- OPTIMIZED LIFECYCLE COSTS AND MAINTENANCE
- COMPLIANCE WITH FEDERAL REGULATIONS AND MANDATES

FREQUENTLY ASKED QUESTIONS

WHAT IS THE WHOLE BUILDING DESIGN GUIDE (WBDG) UFC SECTION?

THE WHOLE BUILDING DESIGN GUIDE (WBDG) UFC SECTION PROVIDES UNIFIED FACILITIES CRITERIA AND GUIDANCE SPECIFIC TO THE UNITED STATES DEPARTMENT OF DEFENSE FOR DESIGNING, CONSTRUCTING, AND SUSTAINING MILITARY FACILITIES.

HOW DOES THE WBDG UFC SUPPORT SUSTAINABLE BUILDING DESIGN?

THE WBDG UFC INTEGRATES SUSTAINABLE DESIGN PRINCIPLES BY PROVIDING CRITERIA THAT PROMOTE ENERGY EFFICIENCY, ENVIRONMENTAL STEWARDSHIP, AND LIFE-CYCLE COST ANALYSIS FOR MILITARY AND FEDERAL BUILDINGS.

WHO CAN USE THE WHOLE BUILDING DESIGN GUIDE UFC RESOURCES?

WBDG UFC RESOURCES ARE AVAILABLE TO ARCHITECTS, ENGINEERS, CONTRACTORS, AND GOVERNMENT PERSONNEL INVOLVED IN THE PLANNING, DESIGN, CONSTRUCTION, AND MAINTENANCE OF MILITARY AND FEDERAL FACILITIES.

WHAT TYPES OF FACILITIES ARE COVERED UNDER THE WBDG UFC?

THE WBDG UFC COVERS A WIDE RANGE OF FACILITIES INCLUDING BARRACKS, HOSPITALS, ADMINISTRATIVE BUILDINGS, TRAINING FACILITIES, AND INFRASTRUCTURE RELATED TO MILITARY INSTALLATIONS.

WHERE CAN I FIND THE LATEST UPDATES TO THE WBDG UFC STANDARDS?

THE LATEST UPDATES TO THE WBDG UFC STANDARDS CAN BE FOUND ON THE OFFICIAL WHOLE BUILDING DESIGN GUIDE WEBSITE, WHICH REGULARLY PUBLISHES REVISIONS AND NEW GUIDANCE DOCUMENTS.

ADDITIONAL RESOURCES

1. *WHOLE BUILDING DESIGN GUIDE: PRINCIPLES AND PRACTICES*

THIS BOOK OFFERS A COMPREHENSIVE OVERVIEW OF THE WHOLE BUILDING DESIGN GUIDE (WBDG) AND ITS APPLICATION IN MODERN CONSTRUCTION PROJECTS. IT COVERS KEY DESIGN PRINCIPLES THAT PROMOTE SUSTAINABILITY, ENERGY EFFICIENCY, AND INTEGRATED PROJECT DELIVERY. THE GUIDE IS ESSENTIAL FOR ARCHITECTS, ENGINEERS, AND CONSTRUCTION MANAGERS SEEKING TO IMPLEMENT HOLISTIC BUILDING STRATEGIES.

2. *UFC STANDARDS FOR SUSTAINABLE BUILDING DESIGN*

FOCUSED ON UNIFIED FACILITIES CRITERIA (UFC) STANDARDS, THIS BOOK PROVIDES DETAILED GUIDANCE ON SUSTAINABLE BUILDING PRACTICES WITHIN MILITARY AND FEDERAL PROJECTS. IT EXPLAINS HOW UFC INTEGRATES WITH THE WHOLE BUILDING DESIGN GUIDE TO MEET STRINGENT ENVIRONMENTAL AND OPERATIONAL REQUIREMENTS. READERS WILL FIND CASE STUDIES AND BEST PRACTICES THAT ILLUSTRATE COMPLIANCE AND INNOVATION.

3. *INTEGRATED DESIGN STRATEGIES IN WHOLE BUILDING PROJECTS*

THIS TITLE EXPLORES THE COLLABORATIVE PROCESSES CENTRAL TO WHOLE BUILDING DESIGN, EMPHASIZING INTERDISCIPLINARY TEAMWORK AND SYSTEMS THINKING. IT HIGHLIGHTS TECHNIQUES TO OPTIMIZE BUILDING PERFORMANCE WHILE MINIMIZING COSTS AND ENVIRONMENTAL IMPACTS. THE BOOK IS VALUABLE FOR DESIGN PROFESSIONALS AIMING TO ENHANCE COORDINATION AND PROJECT OUTCOMES.

4. *ENERGY EFFICIENCY IN WHOLE BUILDING DESIGN GUIDE APPLICATIONS*

DEDICATED TO ENERGY-SAVING METHODS, THIS BOOK ADDRESSES HOW THE WBDG FRAMEWORK SUPPORTS ENERGY-EFFICIENT BUILDING SYSTEMS AND MATERIALS. IT COVERS ANALYSIS TOOLS, CASE STUDIES, AND EMERGING TECHNOLOGIES THAT REDUCE ENERGY CONSUMPTION. FACILITY MANAGERS AND DESIGNERS WILL BENEFIT FROM PRACTICAL APPROACHES TO ACHIEVING ENERGY GOALS.

5. *UFC COMPLIANCE AND IMPLEMENTATION HANDBOOK*

THIS HANDBOOK PROVIDES STEP-BY-STEP INSTRUCTIONS FOR UNDERSTANDING AND APPLYING UFC STANDARDS IN BUILDING DESIGN AND CONSTRUCTION. IT BRIDGES THE GAP BETWEEN REGULATORY REQUIREMENTS AND REAL-WORLD PROJECT EXECUTION. THE BOOK INCLUDES CHECKLISTS, TEMPLATES, AND EXAMPLES TO FACILITATE COMPLIANCE.

6. *SUSTAINABLE MATERIALS SELECTION IN WHOLE BUILDING DESIGN*

FOCUSING ON MATERIAL CHOICES, THIS BOOK EXAMINES HOW SUSTAINABILITY CRITERIA INFLUENCE THE SELECTION OF BUILDING COMPONENTS UNDER THE WBDG FRAMEWORK. IT DISCUSSES LIFE-CYCLE ASSESSMENT, ENVIRONMENTAL IMPACT, AND SOURCING CONSIDERATIONS. ARCHITECTS AND PROCUREMENT SPECIALISTS WILL FIND GUIDANCE ON SPECIFYING ECO-FRIENDLY MATERIALS.

7. *RESILIENT DESIGN PRINCIPLES IN UFC AND WHOLE BUILDING PROJECTS*

THIS BOOK COVERS RESILIENCE STRATEGIES TO ENSURE BUILDINGS WITHSTAND NATURAL DISASTERS AND OTHER THREATS WHILE MAINTAINING FUNCTIONALITY. IT INTEGRATES UFC GUIDELINES WITH WHOLE BUILDING DESIGN CONCEPTS TO PROMOTE DURABILITY AND ADAPTABILITY. THE CONTENT IS GEARED TOWARD DESIGNERS AND PLANNERS FOCUSED ON LONG-TERM BUILDING PERFORMANCE.

8. *WHOLE BUILDING DESIGN GUIDE: FACILITY MAINTENANCE AND OPERATIONS*

ADDRESSING THE OPERATIONAL PHASE, THIS BOOK EXPLAINS HOW WBDG PRINCIPLES EXTEND BEYOND CONSTRUCTION INTO MAINTENANCE AND FACILITY MANAGEMENT. IT HIGHLIGHTS STRATEGIES FOR SUSTAINABLE OPERATIONS, ASSET MANAGEMENT, AND OCCUPANT COMFORT. FACILITY MANAGERS WILL LEARN HOW TO OPTIMIZE BUILDING PERFORMANCE THROUGHOUT ITS LIFECYCLE.

9. *CASE STUDIES IN WHOLE BUILDING DESIGN GUIDE AND UFC PROJECTS*

THIS COLLECTION OF REAL-WORLD CASE STUDIES DEMONSTRATES SUCCESSFUL IMPLEMENTATION OF WBDG AND UFC STANDARDS ACROSS DIVERSE BUILDING TYPES. IT OFFERS INSIGHTS INTO CHALLENGES, SOLUTIONS, AND LESSONS LEARNED FROM FEDERAL, MILITARY, AND COMMERCIAL PROJECTS. THE BOOK SERVES AS A PRACTICAL RESOURCE FOR DESIGN TEAMS SEEKING PROVEN METHODOLOGIES.

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attribute of a system and then analyzing it against some standard, some specification, some best practice, or some benchmark empower a decision maker to take appropriate and timely actions. This book gives you a guide for sustainable practices to ensure accurate measurements, helping you make decisions backed by metrics.

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MANUAL LOCOMOTIVE, DIESEL-ELECTRIC, 56-1/2-INCH GAGE, 60 TON, 500 HP, 0-4-4-0 WHEEL, MODEL RS-4-TC-1A. Published by the Department of the Army on 8 January 1987. 419 page Army GE B-B-160 Locomotive Manual FULL TITLE: INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE MANUAL LOCOMOTIVE, DIESEL-ELECTRIC, 56-1/2-INCH GAGE, 80-TON, 670 HP, 0-4-4-0 WHEEL, MODEL B-B-160/160-4GE747-A1. Published by the Department of the Army on 21 July 1987. 396 page B-B-160 LOCOMOTIVE Parts Manual FULL TITLE: UNIT, INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT REPAIR PARTS AND SPECIAL TOOLS LIST LOCOMOTIVE, DIESEL-ELECTRIC, 56-1/2-INCH GAGE, 80-TON, 670 HP, 0-4-4-0 WHEEL, MODEL B-B-160/160-4GE747-A1 NSN 2210-01-158-2980. Published by the Department of the Army on 31 March 1993. 90 page 1955 Davenport LOCOMOTIVE Maintenance Manual FULL TITLE: LOCOMOTIVE DIESEL ELECTRIC 56½ GAGE, 44 TON 0-4-4-0, 400 HP DAVENPORT BESLER Published by the Department of the Army on 8 November 1955.

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large number of facilities. DoD incorporates life-cycle cost-effective practices into many aspects of the military planning and construction processes. This report provides RAND's description and assessment of the process used to obtain life-cycle cost-effective facilities and how that affects DoD construction options and choices.

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whole building design guide ufc: Risk Management Series: Site and Urban Design for Security - Guidance Against Potential Terrorist Attacks Federal Emergency Agency, U. S. Department Security, 2013-01-27 The Federal Emergency Management Agency (FEMA) has developed this publication, Site and Urban Design for Security: Guidance against Potential Terrorist Attacks, to provide information and design concepts for the protection of buildings and occupants, from site perimeters to the faces of buildings. The intended audience includes the design community

of architects, landscape architects, engineers and other consultants working for private institutions, building owners and managers and state and local government officials concerned with site planning and design. Immediately after September 11, 2001, extensive site security measures were put in place, particularly in the two target cities of New York and Washington. However, many of these security measures were applied on an ad hoc basis, with little regard for their impacts on development patterns and community character. Property owners, government entities and others erected security barriers to limit street access and installed a wide variety of security devices on sidewalks, buildings, and transportation facilities. The short-term impacts of these measures were certainly justified in the immediate aftermath of the events of September 11, 2001, but traffic patterns, pedestrian mobility, and the vitality of downtown street life were increasingly jeopardized. Hence, while the main objective of this manual is to reduce physical damage to buildings and related infrastructure through site design, the purpose of FEMA 430 is also to ensure that security design provides careful attention to urban design values by maintaining or even enhancing the site amenities and aesthetic quality in urban and semi-urban areas. This publication focuses on site design aimed to protect buildings from attackers using vehicles carrying explosives. These represent the most serious form of attack. Large trucks enable terrorists to carry very large amounts of explosives that are capable of causing casualties and destruction over a range of many hundreds of yards. Perimeter barriers and protective design within the site can greatly reduce the possibility of vehicle penetration. Introduction of smaller explosive devices, carried in suitcases or backpacks, must be prevented by pedestrian screening methods. Site design for security, however, may impact the function and amenity of the site, and barrier and access control design may impact the quality of the public space within the adjacent neighborhood and community. The designer's role is to ensure that public amenity and the aesthetics of the site surroundings are kept in balance with security needs. This publication contains a number of examples in which the security/ amenity balance has been maintained through careful design and collaboration between designers and security experts. Much security design work since September 11, 2001, has been applied to federal and state projects, and these provide many of the design examples shown. At present, federal government projects are subject to mandatory security guidelines that do not apply to private sector projects, but these guidelines provide a valuable information resource in the absence of comparable guidelines or regulations applying to private development. Operations and management issues and the detailed design of access control, intrusion alarm systems, electronic perimeter protection, and physical security devices, such as locking devices, are the province of the security consultant and are not covered here, except as they may impact the conceptual design of the site. Limited information only is provided on some aspects of chemical, biological and radiological (CBR) attacks that are significant for site designers; extensive discussion of approaches to these threats can be found in FEMA 426.

whole building design guide ufc: Pavement Drainage: Theory and Practice G L Sivakumar Babu, Prithvi S. Kandhal, Nivedya Mandankara Kottayi, Rajib Basu Mallick, Amirthalingam Veeraragavan, 2019-08-26 SUMMARY This book provides complete coverage of surface and subsurface drainage of all types of pavements for highways, urban roads, parking lots, airports, and container terminals. It provides up-to-date information on the principles and technologies for designing and building drainage systems and examines numerous issues, including maintenance and designing for flood events. Practical considerations and sophisticated analysis, such the use of the finite element method and unsaturated soil mechanics, anisotropy and uncertainties, are presented. This book allows civil engineers to make the best use of their resources to provide cost effective and sustainable pavements. Features Presents a holistic consideration of drainage with respect to pavement performance. Includes numerous practical case studies. Examines flooding and the impacts of climate change. Includes PowerPoint slides which include quizzes, schematics, figures, and tables.

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whole picture | **Weblio** Don 't give you the whole picture. -

whole - **Weblio** whole, entirely, wholly, all, altogether, completely, totally

whole number | **Weblio** whole number - Weblio

whole-body | **Weblio** whole-body; ; ; - 486

whole | **Weblio** whole

entire | **Weblio** entire entire en-tire i ntá'ær

Whole - **Weblio** a whole family - EDR a whole nation one whole year 1 - EDR one's whole self

Whole-wheat | **Weblio** Whole-wheat - (Weblio)

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