

Light Gauge Steel Framing Guide Specifications Poroto

"Natural buildings not only bring satisfaction to their makers and joy to their occupants, they also leave the gentlest footprint on the environment. In this complete reference to natural building philosophy, design, and technique, Jacob Deva Racusin and Ace McArdle walk builders through planning and construction. The Natural Building Companion--provides the tools necessary to understand basic principles of building science, including structural and thermal engineering, and hydrodynamics. This guide offers thorough, up-to-date, and advanced installation details and performance characteristics of straw-bale, straw-clay, woodchip-clay, and cellulose wall systems, as well as earthen and stone wall systems and a variety of framing, roofing, flooring, mechanical system, and finishing options. This fully-illustrated volume informs professionals making the transition from conventional building, homeowners embarking on their own construction, or green builders who want comprehensive guidance on natural-building options. The book, part of the The Yestermorrow Design/Build Library, is accompanied by an instructional DVD"--

Revised and significantly expanded, the fifth edition of this classic work offers both new and substantially updated information. As the definitive reference on fire protection engineering, this book provides thorough treatment of the current best practices in fire protection engineering and performance-based fire safety. Over 130 eminent fire engineers and researchers contributed chapters to the book, representing universities and professional organizations around the world. It remains the indispensable source for reliable coverage of fire safety engineering fundamentals, fire dynamics, hazard calculations, fire risk analysis, modeling and more. With seventeen new chapters and over 1,800 figures, the this new edition contains: Step-by-step equations that explain engineering calculations Comprehensive revision of the coverage of human behavior in fire, including several new chapters on egress system design, occupant evacuation scenarios, combustion toxicity and data for human behavior analysis Revised fundamental chapters for a stronger sense of context Added chapters on fire protection system selection and design, including selection of fire safety systems, system activation and controls and CO2 extinguishing systems Recent advances in fire resistance design Addition of new chapters on industrial fire protection, including vapor clouds, effects of thermal radiation on people, BLEVEs, dust explosions and gas and vapor explosions New chapters on fire load density, curtain walls, wildland fires and vehicle tunnels Essential reference appendices on conversion factors, thermophysical property data, fuel properties and combustion data, configuration factors and piping properties "Three-volume set; not available separately"

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. In-depth coverage of steel framing and information on the newest materials and tools, and the latest details on the code The steel frame ``how-to" for wood-builders The use of steel in residential construction is hot. So if your expertise lies in conventional wood frame construction, you'll definitely want to pick up the Residential Steel Framing Handbook. Robert Scharff and the editors of Walls & Ceilings Magazine take you step-by-step through each stage of the construction process--from preconstruction preparation to interior finishing--delivering all the in's and out's of building houses with steel. Jam-packed with over 350 illustrations and photographs, it's the perfect on-the-job training manual for you and your crew: sound proofing; insulation; calculating load strength; special tools and equipment; drywall and other interior finishes; building codes and zoning regulations; material specifications and selection; connectors and fasteners; steel floor framing; steel framed roofs; and much more.

Highlighted by more than 350 full-color photographs and illustrations, a comprehensive study of sustainable, energy-efficient, and healthful home construction offers a detailed explanation of green building fundamentals that covers such topics as site planning, materials selection, efficient energy alternatives, indoor air quality, and more at every stage in the construction process, from framing to finishes. Original.

The aim of this book is to review recent research and technical advances, including the progress in design codes, related to the engineering applications of light gauge metal sections made in carbon, high strength and stainless steel, as well as aluminium alloys. Included is a review of the new technologies for connections of light gauge metal members. Main advanced applications, for residential, non residential and industrial buildings and pallet rack systems are also covered. For the first time, this book takes into account all the metallic materials now used more and more for structural components. The book will be of great interest not only for researchers but also for design engineers faced to the use of new metallic materials in modern structural applications.

Index of periodical articles selected from journals received in the National Housing Center Library.

A must-have reference to more than 100 common residential conditions—from accessibility issues to working with zinc Practical information that the architect, engineer, contractor and homeowner can access quickly, with over 230 supporting tables photos and details Identifies frequently used reference standards, acceptable practices, and other relevant resources Quick, reliable answers to your most common on-site questions When you're in the field, you never know what you'll come across. Graphic Standards Field Guide to Residential Construction gives you fast access to the information you need when you're on-site and under pressure. Presented in a highly visual and easily portable format, Graphic Standards Field Guide to Residential Construction is organized by CSI's MasterFormat and is coordinated with the 2009 International Residential Code, as well as current sustainable practices. It addresses issues pertaining to residential construction by covering every aspect of the process, such as the use of materials, structural concerns, finishes, thermal and moisture protection, accessible design applications, and more. Graphic Standards Field Guide to Residential Construction extends beyond the studio, with: Quick access to essential information wherever you are Graphic Standards-quality details accompanied by photographs and tables Illustrations that help you troubleshoot

problems, along with on-the-spot solutions Compact format that's easy to reference and carry along Graphic Standards Field Guide to Residential Construction is a handy companion that offers the essential tools that time-crunched professionals can turn to in an instant when dealing with clients, or when handling the many complex demands surrounding construction management.

The Council on Tall Buildings and Urban Habitat has produced four Technical Guides to date, since the series launched in late 2012. Each of these guides is the product of a CTBUH Working Group—committees formed specifically to address focused topical subjects in the industry. The intention of each guide is the same—to provide working knowledge to the typical building owner or professional who wants a better understanding of available options for improving tall buildings, and what affects their design. The object of the series is to provide a tool-kit for the creation of better-performing tall buildings, and to spread the understanding of the considerations that need to be made in designing tall. This technical guide offers an extensive overview of the use of vertical vegetation in high-rise buildings, an indepth analysis of green walls, definitions and typology, including standards, policies and incentives. It features comprehensive case studies, along with architectural theories of the public and private benefits of green walls. The book delves into architect-design considerations and limitations, the effects of green walls on energy efficiencies and includes recommendations and future research.

One of the first really thorough instruction manuals on how to construct residences using steel framing instead of wood, and written by Tim Waite of the NAHB. Covers how to design the structure to accommodate plumbing, wiring and HVAC, how to cut, assemble and secure the steel, how to deal with second-story construction, roof framing using trusses and conventional construction, specialty framing like curved walls and radius windows, how to attach drywall and exterior finishes, how to effectively install insulation, and how to deal with inspectors and the homebuyer.

From ARCOM and The American Institute of Architects A complete visual guide to choosing and using finishmaterials In this unique guide, the authors of MASTERSPEC and ArchitecturalGraphic Standards join forces to offer architects vitalsingle-source access to the unbiased information they need toevaluate, select, and specify the best finish materials for anyjob. This powerful visual resource combines hundreds of illustrationsfrom Architectural Graphic Standards with corresponding buildingmaterial performance and specification information from AIA'sMASTERSPEC, published by ARCOM. Use this book during the schematicand design development phases of a project and as an indispensableaid for product selection and specification. Essential for architects, interior designers, and buildingdesigners, this vital reference provides information to makeinformed decisions about specific design goals, such asaaffordability, environmental friendliness, durability, fireresistance, and esthetic success. Features include: * Unique source of independent, in-depth building productperformance information—the one source that gives you reliablebuilding product information before you consult withmanufacturers * Covers a full range of standard finish materials and includesselection criteria, details, typical product sizes, andinstallation and maintenance data * Provides current standards based on research by government,association, and independent testing organizations as well as theinput of experienced architects and specifiers "Architectural Graphic Standards has served the design communityfor decades as a virtual 'bible' for architectural detailing.MASTERSPEC Evaluations have long comprised one of the bestresources available for building product selection andspecification. Consolidating the strong points of both into thisnew desktop reference is an act of sheer brilliance!" -Martin M. Bloomenthal, FAIA, CCS, CSI, Principal, The HillierGroup, Princeton, New Jersey

The full texts of Armed Services and othr Boards of Contract Appeals decisions on contracts appeals.

First published in 1995, the award-winning Civil Engineering Handbook soon became known as the field's definitive reference. To retain its standing as a complete, authoritative resource, the editors have incorporated into this edition the many changes in techniques, tools, and materials that over the last seven years have found their way into civil engineering research and practice. The Civil Engineering Handbook, Second Edition is more comprehensive than ever. You'll find new, updated, and expanded coverage in every section. In fact, more than 1/3 of the handbook is new or substantially revised. In particular you'll find increased focus on computing reflecting the rapid advances in computer technology that has revolutionized many aspects of civil engineering. You'll use it as a survey of the field, you'll use it to explore a particular subject, but most of all you'll use The Civil Engineering Handbook to answer the problems, questions, and conundrums you encounter in practice.

The comprehensive guide to construction tolerances, newly revised and updated How much may a steel frame be out of plumb? What are the expected variations of a precast concrete panel? What is required to successfully detail finish materials on masonry? Updating and expanding on its popular first edition, the Handbook of Construction Tolerances, Second Edition remains the only comprehensive reference to the thousands of industry standard tolerances for the manufacture, fabrication, and installation of construction materials and components-- including all-important accumulated dimensional variations. Covering new materials and techniques developed since the book was first published, the Second Edition of this easy-to-use reference features: * More than 100 drawings illustrating the tolerance concepts * New sections on measuring compliance with tolerance standards; right-of-way construction; autoclaved aerated concrete; tilt-up concrete panels; interior stone wall cladding; structural insulated panels; decorative architectural glass; laminated architectural flat glass and bent glass * New guidelines on how to incorporate tolerance requirements in drawings and specifications * New information on how to apply tolerance information during contract administration With the Handbook, architects, engineers, contractors, interior designers, lawyers, and others involved in the construction industry will be armed with the information they need to design and detail more accurately, write better specifications, establish normal practice and standards of care, supervise construction, settle worksite disputes, and save time and money at every stage of building.

Covering the broad spectrum of modern structural engineering topics, the Handbook of Structural Engineering is a complete, single-volume reference. It includes the theoretical, practical, and computing aspects of the field, providing practicing engineers, consultants, students, and other interested individuals with a reliable, easy-to-use source of information. Divided into three sections, the handbook covers:

The leading guide to professional home construction—now updated and revised! Fundamentals of Residential Construction, Third Edition features the most up-to-date explanations of today's residential construction systems. From foundation to roof and exterior finishes to interior details, this new edition thoroughly addresses the latest developments in materials and methods of

house construction, including energy efficiency, framing, and roofing. Abundantly illustrated with more than 1,250 drawings and photographs, including new photorealistic illustrations that bring the text to life, this Third Edition provides authoritative coverage on wood light-frame construction, industrialized systems of construction, insulating concrete forms, light-gauge steel frame, panelized construction, and a new chapter on multifamily construction. Topics covered include: Plumbing Building codes Heating and cooling Financing Wiring Roofing Thermal insulation Environmental concerns Foundations Finish sitework Rough sitework Wood and light-gauge steel framing Engineered materials Exterior and interior finishes Organized in a logical, easy-to-follow format, *Fundamentals of Residential Construction, Third Edition* is the one-stop source for building professionals to gain a working knowledge of codes, management procedures, material, and all home building concerns.

Prefabrication and Architecture, a manual about prefab architecture, is primarily written for the architect and construction professional. It is the only professional reference on prefab architecture, with information on the many facets of off-site construction. Prefabrication can allow for greater efficiency and precision, lessen environmental impact, and shorten construction cycles. Smith offers designers and construction professionals guidelines that rethink all stages of the design process in order to effectively utilize the fabrication process.

In recent years, light gauge cold-formed steel members have been used extensively in low and mid-rise residential building construction. In cold-formed steel design there are several applications where built-up box girders are used to resist load induced in a structure when a single section is not sufficient to carry the design load. The cold-formed steel box girders may be subjected to eccentric loading when the web of one of the sections receives the load and transfers it through the connection to another section. There may be an unequal distribution of load in built-up girder assemblies loaded from one side. In the current North American Specification for the Design of Cold-Formed Steel Structural Members (CSA-S136-01, 2001), there is no guideline or design equation to calculate the flexural capacity of this type of section. AISI cold-formed steel framing design guide (2002) has recommended that the moment of resistance and inertia of the built-up section are the simple addition of the component parts, based on deflection compatibility of the two sections. However, this design approximation has not been justified by any experimental or numerical study. Very little information was found in literature about this topic. The objective of this study is the investigation of the flexural behaviour of built-up box girders assembled from cold-formed stud and track sections when subjected to eccentric loading. Finite element analysis is conducted for this purpose, being much more economical than expensive experimental testing. Detailed parametric studies are carried out to identify the factors affecting the flexural capacity of built-up cold-formed steel sections. The parametric results are used to develop a design equation for calculating the flexural capacity of built-up cold-formed steel sections.

Publisher Description

A handy guide to hiring handymen *Don't Sweat It-Hire It!* Is a fun, easy-to-understand guide to hiring professionals to do your home repairs and improvements. It caters to the BIY (buy-it-yourself) consumer, who prefers to hire work done rather than do their own home projects—the fastest growing trend in home improvement. All types of residential maintenance and improvement specialists are included in this book, ranging from the neighborhood lawn care person to construction general contractors specializing in major remodeling and renovation. Readers will learn how to find good, dependable resources, how to check references and work histories, how to negotiate fees and contracts, how to communicate with professionals and supervise their work, and what to do when things don't go exactly as expected. The book includes sample contracts and schedules that readers can use to create contractual agreements, and an extensive list of resources to help consumers find and manage good home repair and improvement specialists.

THE #1 REFERENCE ON BUILDING CONSTRUCTION—UPDATED FROM THE GROUND UP Edward Allen and Joseph Iano's *Fundamentals of Building Construction* has been the go-to reference for thousands of professionals and students of architecture, engineering, and construction technology for over thirty years. The materials and methods described in this new Seventh Edition have been thoroughly updated to reflect the latest advancements in the industry. Carefully selected and logically arranged topics—ranging from basic building methods to the principles of structure and enclosure—help readers gain a working knowledge of the field in an enjoyable, easy-to-understand manner. All major construction systems, including light wood frame, mass timber, masonry, steel frame, light gauge steel, and reinforced concrete construction, are addressed. Now in its Seventh Edition, *Fundamentals of Building Construction* contains substantial revisions and updates. New illustrations and photographs reflect the latest practices and developments in the industry. Revised chapters address exterior wall systems and high-performance buildings, an updated and comprehensive discussion of building enclosure science, evolving tools for assessing environmental and health impacts of building materials, and more. New and exciting developments in mass timber construction are also included. This Seventh Edition includes: 125 new or updated illustrations and photographs, as well as 40 new photorealistic renderings The latest in construction project delivery methods, construction scheduling, and trends in information technology affecting building design and construction Updated discussion of the latest LEED and Living Building Challenge sustainability standards along with expanded coverage of new methods for assessing the environmental impacts of materials and buildings Expanded coverage of mass timber materials, fire resistance of mass timber, and the design and construction of tall wood buildings Revised end-of-chapter sections, including references, websites, key terminology, review questions, and exercises Fully-updated collection of best-in-class ancillary materials: PowerPoint lecture slides, Instructor's Manual, Test Bank, Interactive Exercises, and more Companion book, *Exercises in Building Construction*, available in print and eBook format For the nuts and bolts on building construction practices and materials, *Fundamentals of Building Construction: Materials and Methods, 7th Edition* lays the foundation that every architect and construction professional needs to build a successful career.

Many important advances in designing modern structures have occurred over the last several years. Structural engineers need an authoritative source of information that thoroughly and concisely covers the foundational principles of the field. Comprising chapters selected from the second edition of the best-selling *Handbook of Structural Engineering*, *Interest in sustainable, green building practices is greater than ever. Whether concerned about allergies, energy costs, old-growth forests, or durability and long-term value, homeowners and builders are looking for ways to ensure that their homes are healthy, safe, beautiful, and efficient. In these pages are descriptions and manufacturer contact information for more than 1,400 environmentally preferable products and materials. All phases of residential construction, from sitework to flooring to renewable energy, are covered. Products are grouped by function, and each chapter begins with a discussion of key environmental considerations and what to look for in a green product. Over 40 percent revised, this updated edition includes over 120 new products. Categories of products include: Sitework and landscaping*

Outdoor structures Decking Foundations, footers, and slabs Structural systems and components Sheathing Exterior finish and trim Roofing Doors and windows Insulation Flooring and floor coverings Interior finish and trim Caulks and adhesives Paints and coatings Mechanical systems/HVAC Plumbing, electrical, and lighting Appliances Furniture and furnishings Renewable energy Distributors and retailers An index of products and manufacturers makes for easy navigation. There is no more comprehensive resource for both the engaged homeowner and those who design and build homes. Editor Alex Wilson is president of BuildingGreen, an authoritative source for information on environmentally responsible design and construction, which also publishes Environmental Building News. Co-editor Mark Piepkorn has extensive experience with natural and traditional building methods.

A guide to designing and building the environmentally friendly, energy efficient home of your dreams. More and more homeowners today want houses that are healthy to live in and cause minimal damage to the environment. That's what green building is all about. Your Green Home is written for homeowners planning a new home—whether you are working with an architect or builder, or serving as your own general contractor. Intended to improve the overall environmental performance of new houses being built, the book sets out to answer some of the big-picture questions relating to having a home designed and built—and getting what you want. Your Green Home covers: Home location and its relationship to the community Site design Construction systems Building design to optimize energy performance Renewable energy systems Material selection Indoor environmental quality Water efficiency Material selection Written by the founder of BuildingGreen—North America's premier green building authority—this book will prove useful not only to future homeowners, but also to designers and builders seeking to meet this demand. Building professionals well-versed in green building may find this a useful book to give to potential clients to convey the scope and principles of green building.

The definitive text in the field, thoroughly updated and expanded Hailed by professionals around the world as the definitive text on the subject, Cold-Formed Steel Design is an indispensable resource for all who design for and work with cold-formed steel. No other book provides such exhaustive coverage of both the theory and practice of cold-formed steel construction. Updated and expanded to reflect all the important developments that have occurred in the field over the past decade, this Fourth Edition of the classic text provides you with more of the detailed, up-to-the-minute technical information and expert guidance you need to make optimum use of this incredibly versatile material for building construction. Wei-Wen Yu and Roger LaBoube, respected authorities in the field, draw upon decades of experience in cold-formed steel design, research, teaching, and development of design specifications to provide guidance on all practical aspects of cold-formed steel design for manufacturing, civil engineering, and building applications. Throughout the book, they describe the structural behavior of cold-formed steel members and connections from both the theoretical and experimental perspectives, and discuss the rationale behind the AISI and North American design provisions. Cold-Formed Steel Design, Fourth Edition features: Thoroughly up-to-date 2007 North American (AISI S100) design specifications Both ASD and LRFD methods for USA and Mexico LSD (Limit States Design) method for Canada A new chapter on the Direct Strength Method Updates and revisions of all 14 existing chapters In-depth design examples and explanation of design provisions Cold-Formed Steel Design, Fourth Edition is a necessary tool-of-the-trade for structural engineers, manufacturers, construction managers, and architects. It is also an excellent advanced text for college students and researchers in structural engineering, architectural engineering, construction engineering, and related disciplines.

Learn about the most essential tools and hardware needed for everyday home repair and improvement with The All New Illustrated Guide to Everything Sold in Hardware Stores. From first-time homebuyers to frequent hardware store customers, anyone who owns or rents a home will benefit from knowing their way around building and home centers. With the help of this book, purchases will be correct the first time--no multiple trips and returns. You'll learn the difference between drywall screws and deck screws; between faucet washers and neoprene O-rings; and between red wire nuts and blue wire nuts. And that's before we even get to understanding nail gauges and drill bit sizes. If you've ever searched for a home store product on the Internet, you'll understand the value of this book. Even the most narrow search terms yield a bewildering volume of information. The All New Illustrated Guide to Everything Sold in Hardware Stores allows you to understand the tools and hardware that are applicable to your needs. The next time you talk to a hardware store clerk, rather than asking for "screws about 2 inches long", you'll be able to ask for a #3 gauge 2-1/4-inch-long panhead screws with SAE 5/16" flat washers. And you'll know exactly why this is what you need. The All New Illustrated Guide to Everything Sold in Hardware Stores is filled with color photos that let you see in lifesize scale what different screws and nails and washers and bolts are called, accompanied by brief descriptions of their recommended uses--so you'll be able to ask for them with accuracy and use them with precision.

This book is a compilation of recognized building codes, as well as practical building standards that are consistent with quality construction projects. It illustrates how to measure present building practices, and how to recognize and apply practical building techniques for residential and light commercial construction activities.

Illustrated Theatre Production Guide delivers a step-by-step approach to the most prevalent and established theatre production practices, focusing on essential issues related to the construction of wooden, fabric, plastic, and metal scenery used on the stage. A must-have resource for both the community theatre worker who must be a jack of all trades and the student who needs to learn the fundamentals on his or her own, it covers the necessities in great detail, without bogging you down. Offering techniques and best-practice methods from an experienced industry expert, it will allow you to create a foundation on which to build a successful and resourceful career behind the scenes in theatre production. This third edition has been completely restructured to more effectively lead you through the basics of stagecraft. Through detailed lessons and hundreds of drawings, author John Holloway offers you solutions to the problems that you'll face every day in a production, from rigging to knot tying. New to this edition are guides to jobs in theatre, construction documentation, and video projection methods, with expanded information on Thrust Theatres, lighting, audio and video practices.

This book presents the proceedings of an International Conference on Advances in Engineering Structures, Mechanics & Construction, held in Waterloo, Ontario, Canada, May 14-17, 2006. The contents include contains the texts of all three plenary presentations and all seventy-three technical papers by more than 153 authors, presenting the latest advances in engineering structures, mechanics and construction research and practice.

By presenting the basics of building science along with a prescribed set of details, Designing the Exterior Wall helps you understand why buildings fail and how they can be made more durable through design. Author Linda Brock connects the science and aesthetics of building envelopes through the examination of a variety of construction and cladding types. She features details from real world projects in a variety of climates, successful and unsuccessful case studies, and checklists you can use on your own projects. Helps you reduce your liability by showing why building envelopes fail and how they can be designed to endure. Moves from theory to actual construction by including hundreds of building envelope details from a broad array of projects and climates. Integrates numerous contemporary case studies, including Frank Gehry's Experiential Music Center in Seattle (thin skins), Renzo Piano's Rue de Meaux housing in Paris (terra cotta cladding), and Mario Botta's San Francisco Museum of Modern Art (prefabricated brick panels). Designing the Exterior Wall is a must-have book, whether you're an architect or a student. Order your copy today.

In an era of new, composite materials and high-strength concrete, and with an increasing demand for sustainable building technologies, the importance of the role of steel in construction is

being challenged.. Nonetheless, steel can successfully be used to refurbish and retrofit historical buildings, as well as being a material of choice for new building structures. Steel can effectively be combined with a variety of other materials to obtain structures which are characterized by a high-performance response under different types of static and dynamic activity. The proceedings contains nine keynote lectures from international experts, and is further divided into five sections: calculation models and methods; studies and advances in design codes; steel and mixed building technology; steel under exceptional actions; and steel in remarkable constructions and refurbishment.

Residential Steel Framing Handbook McGraw-Hill Education

Confidently tackle--and accomplish--any wall or ceiling project yourself, with our help! Walls and ceilings are vital to the structural integrity and the overall appearance of any home, so they are worth your time and care. Black & Decker The Complete Guide to Walls & Ceilings gives you all the information you need to understand and maintain structural integrity, while reimagining and remodeling visible surfaces to meet your home decor needs. When you decide to remove a wall and open up the space or create a new wall and a new room, you'll see for yourself how great the impact of walls and ceilings is. All the essentials of framing walls and ceilings are shown with beautiful step-by-step photos in exhaustive detail, including framing window and door openings. You'll also learn the tips and techniques for hanging and finishing drywall on horizontal and vertical surfaces. If you've ever taped and mudded drywall in the past, you'll be amazed to see how much less labor and mess it involves when it's done the correct way. Choosing and applying wallcoverings is also covered in this new book from the experts at BLACK+DECKER, as is the final step in your wall or ceiling project: installing trimwork. Baseboard, crown molding, door and window trim, and much more are explained with color photos and easy-to-follow instructions.

This volume presents chapters highlighting the methodologies and tools developed to improve flood management and flood risk reduction.

"The BIM Handbook presents the technology and processes behind BIM and how architects, engineers, contractors and sub-contractors, construction and facility owners (AECO) can take advantage of the new technology and work process. Unlike CAD, BIM is a major paradigm shift in the documentation, work processes and exchange of project information. It facilitates collaboration and further automation, in both design and construction. AEC professionals need a handbook to guide them through the various BIM technologies and related processes. The collaborative nature of BIM requires professionals to view BIM from various industry perspectives and understand how BIM supports multiple project participants. The BIM Handbook reviews BIM processes and tools from multiple perspectives: the owner, architects and engineers, contractors, subcontractors and fabricators"--

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