

# ERGONOMICS AND FACILITIES PLANNING FOR THE HOSPITALITY INDUSTRY

Daryl Ace V. Cornell, Ph.D., CGSP Jocelyn A. Rivera-Lutap, DPA, FUAP









# ERGONOMICS AND FACILITIES PLANNING FOR THE HOSPITALITY INDUSTRY

Daryl Ace V. Cornell, PhD, CGSP Jocelyn A. Rivera-Lutap, DPA, FUAP

Published & Distributed by:

**@P REX Book Store** 

856 Nicanor Reyes Sr. St. Tel. Nos.: 8736-0567/8733-6746 2161-65 Freedom Bldg, C.M. Recto Avenue Tel. Nos.: 8522-4521/8522-4107 Manila, Philippines wvww.rex.com.ph



Philippine Copyright 2021 by Rex Book Store, Inc. and

. Daryl Ace V. Cornell, PhD, CGSP and Jocelyn A. Rivera-Lutap, MSARCH, DPA, FUAP

RBS Ergonomics and Facilities Planning for the Hospitality Industry 2021 Edition ISBN 978-621-04-2484-3 Classification. Worktext (04-TB-00042-0)

Published, copyrighted 2021, and distributed by Rex Book Store, Inc. (RBSI) with main office at 856 Nicanor Reyes Sr. St., Sampaloc, Manila / Tel. Nos.: 8736-0567, 8733-6746 • Customer Interaction Center/ Tel. Nos.: 8857-7777, 8857-7743-44, 857-7794 to 97 / Email Address: cicsupport@rex.com.ph

**RBSI Branches:** 

#### LUZON

• MORAYTA: 856 N. Reyes Sr. St., Sampaloc, Manila/ Tel. Nos.: 8736-0567, 8733-6746 •-RECTO: 2161-65 Freedom Bldg., C.M. Recto Ave, Sampaloc, Manila / Tel. Nos.: 8522-4521, 8522-4107 » CUBAO: Unit 10 UGF Dora Consolacion Bldg., Gen. Santos Ave, Araneta Center, Cubao, Quezon City/ Tel. No.: 8911-1070 • SOHO-GREENFIELD: Unit 1 Lots 9 & 10 Soho Central Greenfield, Mandaluyong City/ Tel. No.: 7751-4031 • NAGA: 1-1A Geronimo Bldg., 8arlinSt. Sta. Cruz, Naga City / Tel. No.: (054) 472-8654 • CABANATUAN: Fontelera Bldg., 1271 del Pilar Ext., Sangitan East, Cabanatuan City, Nueva Ecija / Tel. No.: (044) 600-5684 • PAMPANGA: Rex Beluan Sentru Bldg., Lot 103 Ste. Rosario St., Brgy. San Jose. Angeles City, Pampanga / Tel. No.: (044) 400-1612 • MAKATI: Unit UG-2, Star Centrum Bldg., Sen. Gil Puyat Ave., Makati City/ Tel. No.: 8818-536,8893-3744 • ROCKWELL: 1st Fir., Ateneo Professional School, Rockwell Center, Bel-Air, Makati City/ Tel. No: 0956-4219711 • BAGUIO: Upper Gen. Luna cor. A. Bonifacio St., Baguio City / Tel. No.: (074) 422-0574 • TUGUEGARAO: 10 Arellano Ext. St., Brgy. Ugac Sur, Tuguegarao, Cagayan / Tel. No.: (078) 844-8072 • URDANETA: Zone 6, Pinmaludpod, Urdaneta City, Pangasinan / Tel.No.: (078) 568-3975 • CAVITE: Block 4, Lot 20 Don Gregorio Heights 2 Zone, 1-A Aguinaldo Hi-way, Dasmarifias, Cavite / Tel. No.: (043) 741-6614 • PAIAWAN: Abad Santos St. car. Valencia St., Puerto Princesa City, Palawan • MARIKINA: Book Museum Cum Cuthara Distributication City/ Tel. No.: 700-0841 • CAVITE: Rex Habitat and Cultural Display Area, Block S. Lot <u>Barting Franses</u>, Barangay, Cavite • BATANES: ODD Habitat Iodging House - Batanes, Llopez St., Barangay Kayvulaganan 3900 Basco,

#### VISAYAS

"oB6 tOBAN: Brgy. 78 Marasbaras, Tacloban city / Tel. Nos.: (053) 323-8976, (053) 523-1784 • ILOILO: No. 75 Brgy. San Isidro Lopez-Jaena, Jars, C; ty / Tel. Nos.: (033) 508-8760, (033) 329-0336 • BACOLOD: No. 28 Quezon Ave., Purok Immaculada, 8rgy. 36, Bacolod City ∕ Tel. No.: (034) 707-5825 • CEBU: 11 Sanciangko St., Cebu City ∕ Tel. Nos.: (032) 416-9684, (032) 254-6773

#### MINDANAO

~~~~O: 156-AC. M. Recto St., Davao City/Iei. Nos.: (082) 300-5422, (082) 305-5772, (082) 221-0272 • ZAMBOANGA: Don Alfaro St., Brgy. Tetuan,
 • GENbanga Oty/Tel. No.: (062)955-0887 • CAGAYAN DE ORO:J. Seriiia St. cor. Vamenta Blvd., Carmen, Cagayan de Oro City/Tel. No.: (088)858-6775 ERAL SANTOS: Aparente St., Dadiangas Heights, General Santos City/Tel. Nos.: (083) 304-8512, (083) 554-7102

www.rex.com.ph

No portion of this book may be copied or reproduced in books, pamphlets, outlines, or notes—whether printed, mimeographed. typewritten, photocopied, or in any form—for distribution or sale, without the written permission of the Publisher and Author/s. I.... The infringer shall be prosecuted in compliance with copyright, trademark, patent, and other pertinent laws.

#### Re

#### Internet Link Disclaimor

linilinilinilinilinilinilinilinilinilinilinilinilinilinilinilinilinilini

I\""--√er, the publisher does not warrant sites or the servers that make them available are free of viruses or other harmful con\_ponents. it,, 9k store, the. **(R8SI) does not warrant or make any representations regarding the use or the results of the use of the materials in these** 

PR, n third-party sites in terms of their correctness, accuracy, timeliness, reliability, or otherwise.

~h~:•, 800k Association Memberships: Philippine Booksellers Association, Inc. (PBAI); Book Development Association of the Philippines (BDAP); h\*, Pine Educational Publishers Association (PEPA); Book Exporters Association of the Philippines (BEAP); Academic Booksellers Association of p\*\*//ppines (ABAP); Children's Literature Association of the Philippines, Inc. (CLAPI); Asian Publishers Resources Center (APRC)

"G ■ International Book Association Memberships: International Publishers Association (IPA); Asia Pacific Publishers Association (APPA); "1-1 Book Publishers Association (ABPA); Philippine Book Publishing Development Federation (Philbook)



84 P. Florentino St., Sta. Mesa Heights, Quezon City / Tel. No.: 8857-7778



# CONTENTS

| PREFACE    |                                                              |     |  |
|------------|--------------------------------------------------------------|-----|--|
|            |                                                              |     |  |
| CHAPTER T  | Understanding Hospitality Facilities Planning and Ergonomics | 1   |  |
| CHAPTER 2  | Principles of Interior and Exterior Design                   | 7   |  |
| CHAPTER 3  | Workstation Facilities Design and the Hospitality Industry   | 22  |  |
| CHAPTER 4  | Repetitive Task, Task Design, and Risk Assessment            | 35  |  |
| CHAPTER 5  | Job Demands, Health, and Well-being                          | 49  |  |
| CHAPTER 6  | Site Selection ,                                             | 61  |  |
| CHAPTER 7  | Planning Specifics for Hospitality and Tourism Property :    | 73  |  |
| CHAPTER 8  | Space Allocation                                             | 80  |  |
| CHAPTER 9  | Energy and Electricity                                       | 99  |  |
| CHAPTER 10 | Water and Wastewater Systems                                 | 108 |  |
| CHAPTER I  | Heating, Ventilation, and Air-conditioning                   | 119 |  |
| CHAPTER 12 | Envir.onment and Sustainability                              | 134 |  |
| CHAPTER 13 | Safety, Security, and Resiliency                             | 145 |  |
|            |                                                              |     |  |
| REFERENCE  | S                                                            | 163 |  |

| INEI EKEI | ICES |       | 105 |
|-----------|------|-------|-----|
| IN DEX    | 1    | ····· | 175 |

# INDEX

А accommodation or lodging facility food and beverage facility jobs in food and beverage category, 50 accomplishing a safety checklist, 49 activities involved in emergency power systems repair checking the levels of fluid in battery systems, 105 testing the battery charge level, 105 testing the proper battery room ventilation, 105 anthropometry, 23 architecture and operational features to reduce security issues at hotels equipping guestrooms with phones to make emergency calls, 160 installing deadbolt locks on the connecting doors on both sides, 160 installing guestrooms with automatic doors with the system of selfclose and lock. 160 providing guests with details on property protection, 160

# В

bar, 30 benefits of energy-saving solutions enhancing performance, 140 recovering and repurposing waste energy, 140

reducing hours of service, 140 reducing the load, 140 using the least expensive source of energy, 140 benefits of operating according to SDGs appeals to a broader audience, 143 attracts investment, 143 drives business growth, 142 increases brand appeal, 143 reduces risks, 143 refocuses on business importance, 143 brand creation through site selection, 65 building design, maintenance, and safety, 148 business dynamics, 136

# С

category of the site land use plan, 64 catering and conferences administrative, 88 amenities and recreational areas, 88 back of house ancillary and service facilities, 89 employee facilities, 88 function space, 87 restaurant, 85 retail shop, 87 characteristics of a well-planned space accessible, 81

adaptable and flexible, 81 adherence to laws and regulations, 82 appropriate ambiance, 80 efficient and effective space utilization. 80 minimum movement, 82 reduced discomfort, 82 wayfinding, 82 components of electrical systems, 99 concept of electrical systems, 99 concept of heating, ventilation, and airconditioning, 119 concern for workers' productivity, and retention, 146 conservation and management of energy, 138 convection, 121 corrosion and erosion in water piping systems, 115 cost of protection-related losses and safety issues, 145 criteria for site selection of hospitality and tourism facilities building, 63 cost of construction or renovation, 63 legal issues and restrictions, 63 location. 62 site access to transportation, 62 access to utilities, 62 land area. 62

# D

designing process of planning for producing an object or space, 7 design of spaces, 43 dimension of social responsibility, 137 dining halls workforce in dining halls bartenders, 51 busboys/busgirls, 51 restaurant receptionists, 51 waiters/waitresses, 51 discharge/sewage water, 113

# Е

economic interests, 136. effectiveness of machines, 140 electrical distribution system in the hospitality and tourism industry, 100 electrical maintenance equipment **f**use puller for cartridge fuses, 106 hydrometer, 106 multimeters, 106 rubber boots, gloves, and insulated ladders, 106 wall receptacle analyzers, 106 electrical plans, 101 electrical system and equipment maintenance, 101 electricity, 99 electronic equipment, 103 elements of an effective electrical system, 99. elements of visual design color color scheme. 10 decorative uses and effects of colors, 11 hues of the spectrum, 9 psychological significance of colors, 10 form and shape, 12

light, 14 line curved line, 9 diagonal, 9 horizontal. 9 straight, 8 vertical, 8 pattern, 14 animal prints, 15 complex, 14 floral, 15 horizontal lines. 15 motifs, 15 vertical lines, 14 texture, 13 emergency power systems, 104 energy saving tips hotels, 139 entertainment and recreation, 94 entertainment and recreation facilities artists and performers, 52 media and communication workers. 52 security guards and bouncers, 52 ticketing staff, 52 ushers and recreation attendants, 52 entertainment facilities casino. 97 cinema, 96 shopping facility, 95 spa, 96 sports complex, 95 environmental implications of chlorofluorocarbons and hydrochlorofluorocarbons, 125 environmental management practices by lodging properties, 134

ergon, 23 ergonomically designed equipments, fixtures, furniture, 23 ergonomics science of standardization human measurement and human anatomy, 23 ethical and moral responsibility of managers for the well-being of tourists and employees, 145 evaporation, 121

# F

facilities location needs of employees, 2 needs of guests, 2 needs of other stakeholders. 2 needs of suppliers, 2 facilities planning concepts, 1 ease of supervision, 4 effective utilization of resources manpower, paraphernalia, 3 workspace, and energh flexibility, 4 maintenance, 4 process of designing layout and location, 24 facility design, 2 facility layout, 2 facility system analysis structures and roles of the wor systems, 2 zo'' facility systems, 2 factors affecting building thermal  $co^{\circ}$ . air movement insi<sup>id</sup>e t<sup>th</sup>e room<sup>1</sup>?

air temperature of the room, 12°

Index

material used in the room occupants' clothing, 120 relative humidity within the room air, 12 room activity level, 120 surface temperature of the room, 120 wet-bulb temperature in the room, 12 < factors in determining layout and design accommodation, 24 ease of movement, 24 safety, 24 versatility of space for expansion, 24 factors in determining space allocation, 80 factors influencing the development of hospitality and tourism facilities economics. 73 enterprise, 73 location, 73 marketing, 73 planning and design, 73 factors influencing the quality of water and wastewater systems in the hospitality establishments, 108 fire control smoke control equipment, 158 fire dampers, 158 fire detection, 154 fire evacuation, 159 fire notificatio construction of horns and alarms. 154 instructions for emergencies and floor plans, 154 lights for the exit, 155 single-station smoke detectors, 155

speech alarms, and visual alarms, and devices for contact, 155 fire prevention, 152 fire safety, 151 fire suppression, 156 food and beverages airlines and cruise ships, 92 catering and banquets, 92 restaurants, 91 food preparation areas, 93

## G

general classification of workstations concierge and office area, 25 kitchen, 26 general division of a facility back of the house, 22 front of the house, 22 general tasks for hospitality and tourism facilitie \_\_\_\_\_ cash handling, 41 crashes and collisions, 42 electrical risks. 40 exposure to hazardous substances and dangerous goods, 39 exposure to loud noises, 41 extreme environmental conditions. 40 manual handling, 38 movements and maneuvers. 39 operating machinery and equipment, 39 work violence, sexual harassment, and stress, 42 genesis of ergonomics work-related physical symptoms, 35

good facility design safety of workers increased quality of delivery of goods and services, 24 material handling, 24 utilization of equipment, 24

## Н

healthy environment natural and manmade environment physical, chemical, biological, and psychological aspects, 49 heating equipment and its sources, 123 hospitality facilities planning, 1 hospitality and tourism facilities department store, 4 hotel. 4 museum. 5 resorts. 4 restaurant. 4 shop, 4 sports and recreational club/center, 4 tourism enterprises, 4 training center, 5 hospitality and tourism industry importance of interior and exterior design, 7 quality of service, 49 risks to workforce physical and psychological, 49 hospitality industry employees' health, 1 employees' safety, 1 guests' health and safety, 1

human factors and ergonomics relationship between people and technology. 2 HVAC maintenance in the guestroom, 131 HVAC system in other building areas, 131 HVAC system in the guestroom centralized systems four-pipe system, 126 three-pipe system, 126 two-pipe system, 126 decentralized systems, 127 hybrid and other systems, 130 HVAC system types and their configurations, 131 HVAC upkeep and requirements, 132 impact of hospitality industry on the environment, 134 importance of checklist in the workplace, 56 importance of construction design for defense, protection, and resilience of operations, 145 importance of design in the hospitality and tourism industry, 8 importance of ergonomics in the

workspace improvement in workforce productivity, 24

promotion of culture of safety, 24

reduction in unnecessary expenses,

24

 importance of facilities planning
 facilities planning with human factors and ergonomics, 3
 importance of location in the hospitality and tourism industry, 61 importance of risk assessment in the hospitality and tourism industry, 36
importance of water and wastewater systems in the hospitality industry, 108
industrialization relationship between labor and health, 23
issues and challenges of space allocation,

97

# J

job descriptions in the accommodation and lodging category guest service representatives/ concierge staff, 50 hotel/lodging managers, 50 housekeeping supervisors and staff, 50

# Κ

kinds of risks accidents, 36 hazards, 36 kitchen ventilation and hood system, 153

# L

laundry drying, 32 folding linen, 33 sorting, 31 washing, 32 Likert scale for site selection, 70 loads and comfort built-up, 122

# М

maintenance and miscellaneous areas computer room, 91

generalstorage,90 meeting room storage, 90 room service area, 91 telephone switchboard and equipment, 91 utility rooms and systems, 91 major concerns in promoting safe and healthy workplace psychological and physical aspects, 36 major sectors of the hospitality and tourism industry accommodation and lodging, 82 front of house, 83 major sectors of the hospitality industry accommodation and lodging, 25 entertainment arid recreation, 25 food and beverage, 25 travel and tourism, 25 mechanism to practice safe and secured standard measures, 145 motivations for care for the atmosphere, 135

# Ν

need for sustainability use of SDGs as a guide by hospitality establishments, 142 nomos, 23

# 0.

objectives of facilities planning, 3 occupational fatigue, 23

# р

parts of kitchen cleaning/washing, 28

food preparation area, 29 meal cooking area, 30 storage, 28 planning specifics for hospitality and tourism property, 73 planning specifics for hotels and other lodging establishments the guest and his/her experience, 75 the guestroom, 75 the hotel common areas, 76 storytelling and design concept, 74 planning specifics for restaurants and other foodservice establishments choosing the right light, 77 establishing a clear layout, 77 heating and ventilation, 78 importance of entrance, 76 selecting good music, 78 selecting the colors well, 77 selection of tables. 77 taking care of restrooms, 78 target clients, 76 primary elements of safety measures for workers composing and presenting a written policy to all staff, 147 conducting periodic safety checks, 148 providing a transitional program for the faster return of injured workers to work, 148 setting practical accident prevention targets, 148 training, retraining, and more coaching of workers, 148 using the feedback of line staff on safety issues, 148

principles in creating a good commercial kitchen design expedient monitoring, 27 flexibility and modularity, 27 maintenance of sanitation, 27 movement of materials and personnel, 27 simplicity, 27 space efficiency and effectivity, 27 problems related to the safety in the gues bath electrical shocks, 150 hot water temperatures, 150 proper bathroom construction, 150 slip resistance of bathtubs, showers, and bathroom floor coverings, 150 procedures and maintenance of different cooling systems, 124

# R

radiation, 121 reducing hazards and risks developing a safety plan to control hazards. 37 documentation of incidents. 38 evaluating and planning the workspace, 37 records maintenance, 38 regular inspection and maintenance of workplace, 37 re-tooling the workforce, 38 training the workforce, 38 reducing the hospitality industry'S workplace injury rates, 145 regulatory concerns, 136 repetitive task, 35

requirements for an efficient electrical maintenance program appropriate housekeeping procedures in electrical equipment areas, 101 awareness of proper protection protocols, 101 clear understanding of electrical procedures, 101 collection of electrical system plans for the building, 101 requirements for safe work, 49 risk assessment, 35 risk management plans, analysis, and assessment. 44 role of design creation of necessary ambiance, 7 influence on people's perceptions and actions, 7 promotion of the concept of lodging, food, recreation, and transportation, 7 role of sustainability in business strategy of a hospitality operation, 134 role of workstations. 22

## S

safety and security risks with kitchen hoods, 157 safety and security systems and the American Disabilities Act (ADA), 149 safety in the guest bath, 150 sick building syndrome, 53 significance of safety and security for each job, 49 site criteria by sectors of the hospitality and tourism industry accommodation and lodging bed and breakfast, 67

condotel. 67 hotels. 66 resort hotel, 67 entertainment and recreation. 69 food and beverage, 68 travel and tourism offices, 69 site selection, 61 softening of water, 113 sources of heat, 123 space allocation, 80 specified area designations for various types of food auxiliary areas, 93 baking station, 93 meat preparation, 93 salad preparation, 93 sandwich preparation, 93 serving areas, 93 vegetable preparation, 93 steam and hot water use. 108 storm sewer system, 111 Sustainable Development Goals (SDGs) released by the United Nations World Tourism Organization, 141 swimming pool water systems, 116

### т

task design, 35 tourism, 1 tourism and hospitality operations, 3 tourist information, 97 training of maintenance workers for operating electrical systems, 102 travel and tours category in the hospitality and tourism industry travel consultants, 52 travel guides, 52 traveler safety tips, 161

# ۷

visual design elements in furniture, 16 visual design elements in structures, 20 visual design principles in architecture balance, 16 character, 19 contrast, 18 emphasis, 17 proportion and scale, 17 rhythm and movement, 17 unity, 19

## w

water conservation. 117 water for entertainment and recreation, 116 water heating, 114 water heating concepts in hospitality and tourism establishments, 108 water heating options heat pump water heaters, 114 indirectly fired water heaters, 114 water quality, 112 water system maintenance concerns, 114 water systems, 110 water usage in the lodging industry, 109 ways to avoid sick building syndrome clear guidelines and protocols, 55 proper apparel, 55 proper planning and design, 53 adequate work area, 54 fire protection, 54 furniture, 55 lighting, 54

materials, 55 structural integrity, 54 temperature, 54 ventilation, 54 wayfinding, 54 safety signs, 55 workplace safety and security in hospitality industry, 145 workstation design delivery of quality service to clients 23 workstation facilities design hospitality and tourism industry, 22