



Log in to the Area of Architectural Design Looking to the Dwarfism

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Abstract: The human race of people from all colors, shapes and sizes is formed. This variety, though beautiful, but a fundamental challenge for ergonomic design who seek to Match the capabilities and limitations of the users to their environment. Physical space requirements and operational biomechanical ability yare two design parameters governed mainly by the user's physical attributes and consequently body size has an effect on the design's usability, comfort, and efficiency. The purpose of this study was to determine the definition of Dwarfism and architectural design solutions for Dwarfism. And here the question arises whether it is possible to determine ways to design for people Dwarfism. In terms of ontological, Foundations philosophy is positivism research and the relationship of the researcher and subject is not relatively straight; this means there is nothing to do research and researchers together and the result of the research does not impact and relevance to researchers and research methodology is quantitative. In this article we have tried to find out a solution in the field of architecture for the needs of Dwarfism So that people can easily do their chores.

Keywords: Architectural Design, Dwarfism, Ergonomic

1. Introduction

The human race is comprised of people of all colors, shapes, and sizes. This variety, although beautiful, presents a fundamental challenge for ergonomic designers who seek to match the capabilities and limitations of the users to their environment. Physical space requirements and operational biomechanical ability are two design parameters governed mainly by the user's physical attributes and consequently body size has an effect on the design's usability, comfort, and efficiency. For example, work surfaces must be at a height that will not strain the back, emergency shutoff valves must be within reach and easy to operate, machine guards must block the passage of hands and fingers to safety hazards, and seat pans must be deep enough to support the thighs and also short enough to not cut into the back of the legs. The challenge of achieving ergonomic design is exacerbated by the variety inherent in the user population and results in the realization that one size does not, in reality, fit all. In fact, demographic surveys of the United States have shown that two out of every five people are "extra-ordinary" in some essential aspect

(Kroemer 2006). In essence, forty percent of the population does not conform to the average for some characteristic or dimension. Some examples of these "extra-ordinary" populations are pregnant women, children, the disabled, the elderly, and the very small or very large. This study investigates the dwarf population and Determine the architectural design for the Dwarfism. In terms of ontological, Foundations philosophy is positivism research and the relationship of the researcher and subject is not relatively straight; this means there is nothing to do research and researchers together and the result of the research does not impact and relevance to researchers and research methodology is quantitative. In this article we have tried to find out a solution in the field of architecture for the needs of Dwarfism So that people can easily do their chores. In the following various methods are known.

2. Dwarfism

2.1. Dwarfism

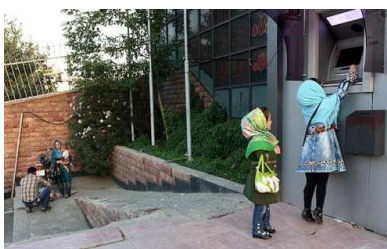
Dwarfism is one of the oldest and most profound forms of

physical difference in humans; it can be recognized in skeletal remains and diverse cultural representations throughout history. The word dwarfism simply means stunted growth, but this simple word represents over three hundred different genetic conditions known as short stature syndromes (Pennell 2000). More than two hundred of these syndromes are classified as skeletal dysplasia's (Beighton, Gideon, and Gorlin 1992); the word dysplasia signifying "abnormal growth" of the skeleton resulting in both proportionate and disproportionate forms of short stature. While anyone with the genetic condition of dwarfism may be called a little person, there is a generally accepted height cutoff of 1.45m (57in) recommended by the World Health Organization as the definition of a short stature person (Pinnell, 2000)

The following are just a few of the situations encountered during the workday of Angela Van Etten, a former lawyer in New Zealand who also has Larsen's Syndrome, as recounted in her book *Dwarfs Don't Live in Doll Houses* (Van Etten 1988):

- Not being able to reach door handles and having to wait for others to open them for her
- climbing steep steps only by pulling herself up by the handrail
- having to wait for someone to enter the elevator and push the desired floor button that she could not reach
- Not being seen over the receptionist counter and wondering if she would ever receive service
- having to forego using the sink in a public restroom because she could not reach the fixtures, the soap, or the towels
- having to make a local call collect because she was not able to reach the coin slot on a public pay phone
- being trapped in a bathroom where she could not reach the lock and had to wait for someone to come rescue her

In the following form there is also difficult situations, such as driving, shopping foods or finding the right dress.



References: (www.farsnews.com,2009)

Figure 1. Dwarfism problems in urban areas.



References: (www.farsnews.com,2009)

Figure 2. Dwarfism problems in urban areas.



References: (www.farsnews.com,2009)

Figure 3. Dwarfism problems in urban areas.

2.2. Architecture and Outdoor Spaces for Dwarfism

In every society there are various groups of people according to their needs called for certain areas; So if we're aware that consumer's needs is a design requirement, and feel dwarfism as well as an important presence of people feel, We found to be appear a suitable architecture for these people to be in a comfortable environment with average height people. Inattention to the issue makes dwarfism to be in harsh and annoying conditions. Because design have been thinking, regardless of all walks of life. For example office places with height tables, parks and public places, long counter of pharmacies, high chairs of cinemas and etc. which causes dwarfism are not able to use them. . In fact, the inappropriateness of the urban environment, has led dwarfism to be deprived active and strong presence in the community and using public places like parks. In practice they have encourage to spent away from the community and staying at home.

T number text heads-the template will do that for you.

2.3. Anthropometry and Design Philosophy

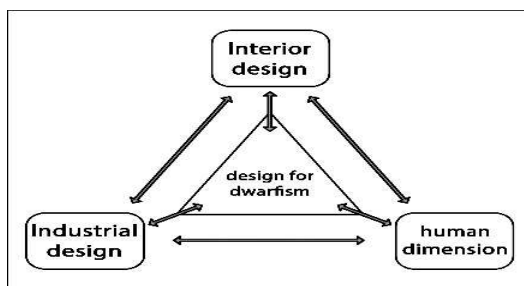
Whether it fits everyone or not, everything is designed based on human measurements: every tool, every desk, and every car seat. Either the designer built it to fit his or her own body, or a collection of human measurement data was referenced. These collections rely on anthropometry, the science of measuring people, and seek to describe dimensions, flexibility, and various physical characteristics of the human population. It behooves the designer to satisfy the largest number of people without overly frustrating the rest so that the customer base is increased and user satisfaction is maintained. Therefore, designs regularly adhere to one of three philosophies: design to fit the average person, design to fit the extremely large or small person, and design to accommodate a wide range of people. These philosophies operate under knowledge of the fact that anthropometric data are normally distributed and can be described using the mean and standard deviation (Kroemer and Grandjean 2005). Additionally, design parameters which will accommodate certain percentages of the population can be calculated using percentiles. In this way, the user population provides the model for the size and space requirements of a product or environment according to the chosen design philosophy. Designing for a range incorporates adjustability in order to be

suitable for the majority of users while extreme body sizes are disregarded (Kroemer and Grandjean 2005). This majority typically covers ninety percent of the population, from the 5th percentile female to the 95th percentile male. In contrast, the cheapest and least preferred philosophy is to design for the average (Nebel and Freivalds 2003). This method uses the data from the 50th percentile of the evenly mixed male and female population. While trying not to duly inconvenience anyone, this method succeeds in fitting nobody, given that the “average person” does not exist. No one falls in the 50th percentile for all their body measurements (Tayyari and Smith 1997). Products built for the average person are usually public facilities like restroom sinks, park benches, or school desks which have many different users for relatively short periods of time. By definition, using 50th percentile measurements will cause half of the people to find certain dimensions too small while the other half will find them too large. The greatest number of people can be accommodated when designing for extremes. This philosophy is somewhat limited in application and is most often applied to clearance and reach dimensions utilizing the extremes ends of the population distribution. Clearances like doorways are built to allow the 95th percentile male to pass through and in so doing also accommodate the shorter 5th percentile female. Light switches are installed within reach of the 5th percentile female which assures that the 95th percentile male can also operate them. Whenever possible, designers should welcome the possibility of satisfying the requirements of almost everyone with a single dimension. The success of any of these design philosophies depends on how accurately the referenced anthropometric data reflect the user population. Although the earliest reference to a dwarf is recorded in Egyptian correspondence sometime before 2631 B.C. (Adelson 2005), there is still not a great deal of available anthropometric data on this population. The first measurements of dwarfs were collected by doctors at the turn of the twentieth century (Adelson 2005).

3. Principles Designed for Dwarfism

According to some studies, principles designed are divided into three parts.

1. The human dimension
2. Interior design
3. Industrial Design



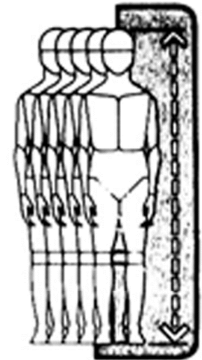
References:(www.wellingerdesigns.com,2014)

Diagram 1. Principles designed for dwarfism.

3.1. The Human Dimension

Due to a variety of short stature that are more than 200 types, Can be designed individually for each group Because of this, the standard height is used. For this purpose the questionnaire was completed by 32 dwarfism people which 35% of them are male and 65% female. The average height of these people is 124 cm.

Size Height



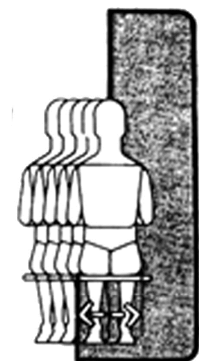
Gender	Inch	CM
Boys	49	124.4
Girls	48.7	123.6

50

References: (Paner,2000)

Figure 4. Size height .

Rump width



Gender	Inch	CM
Boys	8.4	21.3
Girls	8.5	21.6

50

References: (Paner,2000)

Figure 5. Rump width.

According to this average height can be using the relevant standards in book to design for dwarfism easily. (In the following tables)

Height behind The knee



Gender	Inch	CM
Boys	12.2	31.1
Girls	12	30.6

50

References: (Paner,2000)

Figure 6. Height behind the knee.

Knee height



Gender	Inch	CM
Boys	15	38.2
Girls	14.9	37.8

50

References: (Paner,2000)

Figure 9. Knee height.

Thick thighs



Gender	Inch	CM
Boys	3.8	9.6
Girls	3.8	9.6

50

References: (Paner,2000)

Figure 7. Height behind the knee.

From knee to hip



Gender	Inch	CM
Boys	15.7	39.9
Girls	15.8	40.1

50

References: (Paner,2000)

Figure 8. From knee to hip.

3.2. Interior Design

Interior design is a process to shape the internal space through the manipulation of existing volumes (floor, ceiling, wall, etc.) or improve the performance of space. Interior design is an art and science of human behavior to create functional spaces with maximum efficiency in buildings designed by architecture. Designing For dwarfism should do so that people feel comfortable and because they are physically shorter than others, the height of cabinets, desks, electrical sockets should be Lower that separate in to 2 spaces: Residential space (Fig. 10 and 11) and in public spaces (Fig. 11and 12)

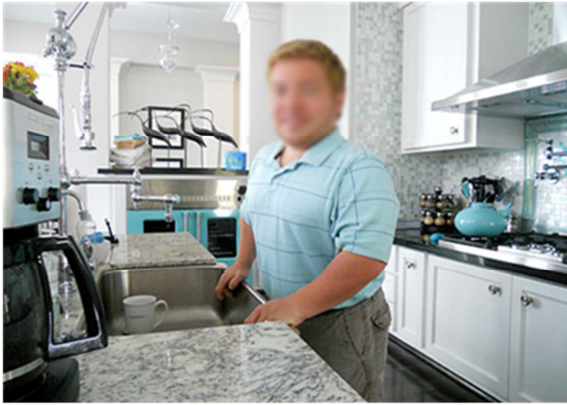
3.2.1. Residential Spaces

Houses couple Bill and John in America



References:(www.Hookedonhouses.net,2014\02\01)

Figure 10. Houses couple Bill and John in America.



References: (www.Hookedonhouses.net,2014\02\01)

Figure 11. Houses couple Bill and John in America.

3.2.2. Public Spaces

ATM in Nottingham, England



References: (www.dailymail.co.uk,2014\11\25)

Figure 12. Houses couple Bill and John in America.

3.3. Industrial Design

Industrial Design is a design directory which is concerned in different areas of human life. Designing in this area must be such that dwarfism people can easily use it. (Design in Mrs. Henderson's home Figure: 13 and 14).

Mrs. Henderson's Home



References: (www.ilxor.com, 2014\02\01)

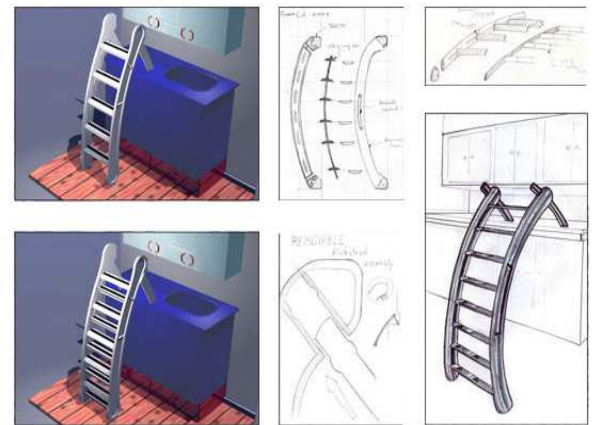
Figure 13. Mrs. Henderson's Home.



References: (www.ilxor.com, 2014\02\01)

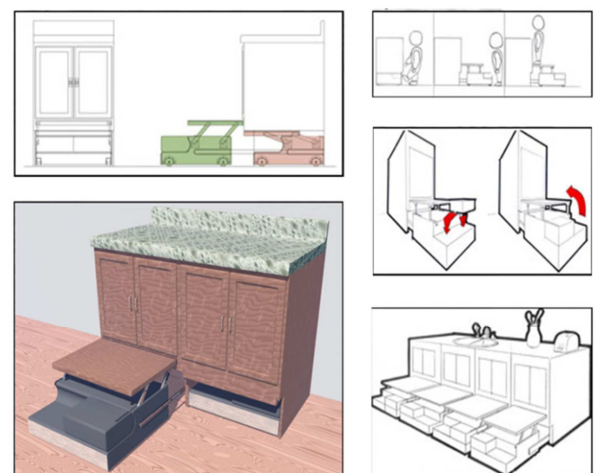
Figure 14. Mrs. Henderson's Home.

As you can see in the figures it is possible to change the design of tall people for dwarfism with simple solutions.



References: (www.wellingerd designs.com, 2014\02\01)

Figure 15. Furniture designed to dwarfism.



References (www.wellingerd designs.com, 2014\02\01)

Figure 16. Furniture designed to dwarfism.



References:(www.wellingerdesigns.com, 2014\02\01)

Figure 17. Furniture designed to dwarfism.

4. Conclusions

The study is to confirm the content hypothesis. In this context what is important is the need to create a favorable environment in the design of living and work space of dwarfism and minimize domain of environment changes. The remarkable thing is to be considered entertainment aspects in a way that dwarfism people can use them easily. Even the most accommodating current design philosophy which considers more than ninety-five percent of the population overlooks a substantial number of people. Little people, or persons with dwarfism, are shorter even than the 5 percentile female for which reach standards are designed. This means that dwarfs, although productive members of society, are never being considered in the design of society's products and environments. In addition, there is a great lack of anthropometric information on adult little people for which to use in design. In response, this article aims to design methods suitable for dwarfism which Anthropometric data were obtained through questionnaires. So that in the future, the designers identify parallax, status and milestones with this article and reduce the time to design.

References

- [1] Paner, Julius.2000, Human dimension and interior space, Translator: Mohammad ahmadinjad, Esfahan. Publication : khan
- [2] BETHANY L. FERGUSON, B.S.2007 Submitted to the Graduate Faculty of Texas Tech University in Partial Fulfillment of the Requirements for the Degree
- [3] Lawson, Brian, (2001), The Language of Space, Architectural press, London.
- [4] Proshansky, H. M. Fabian, A. K. & Camino! R. (1983), Place-identity: physical world socialization of the self. Journal of Environmental Psychology, vol 3, pp 57-83.
- [5] R.Cuthbert, Alexander, (2006), the Form of Cities. Blackwell publishing, Australasia.
- [6] Philippe Morel, July 2011, Sense and Sensibly, Architectural Design, Wiley Blackwell (Blackwell Publishing).
- [7] Elke van der Meer, Martin Brucks, Anna Hussmann, (2011),Human Perception of Urban Environment and Consequences for its Design,springe.
- [8] Berinstein, Sofia Rebeca, 2012, Projects on the geometry of perception and cognition, Massachusetts Institute of Technology.
- [9] Relph E. 1976. Place and placelessness. London: Pion Limited.
- [10] NASAR, J. L. 2011. Environmental Psychology and Urban Design. In: BANERJEE, T. SIDERIS, ANASTASIA LOUKAITOU (ed.) Companion to Urban Design.
- [11] Carmona, Mathew, (2006), Public Places, Urban Spaces. Architectural press, Elsevier, Oxford.
- [12] www.kylestetzdfd.wordpress.com 2013\04\23
- [13] www.delawaretoday.com 2013\06\21
- [14] www.wellingerdesigns.com 2014\02\01
- [15] www.dailyrecord.co.uk 2013\02\16
- [16] www.architecturelinked.com 2013\02\16
- [17] www.education-portal.com 2014\05\23
- [18] www.betterworldbooks.com 2014\07\01
- [19] www.designmena.com 2014\09\06
- [20] www.dailymail.co.uk 2014\11\25
- [21] www.ilxor.com 2014\02\01
- [22] www.Hookedonhouses.net 2014\02\01