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## Ritsy: Flat-Pack Furniture for the Urban Nomad

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RITSY: FLAT-PACK FURNITURE FOR THE URBAN NOMAD

by

Emily D. Fleming

A THESIS

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# RITSY: FLAT-PACK FURNITURE FOR THE URBAN NOMAD

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Today modern technology has allowed us the choice of vast geographical locations for living and working. About 1 in 6 Americans move each year. The highest mobility rates are found for young adults, ages 20 to 24 who were associated with over one third of the entire moving population, in a single year. (Hansen, 2008) The Americans of today enduring this behavior pattern are termed Urban Nomads. The ideals of such a person and behavior rest in the ability to live simply for the sake of mobility.

The combination of our economy today, the exceedingly important environmental issues that arise, and the ongoing ideals of the Urban Nomads have led us to question, 'Can I do without it?' 'Can I do with less?' because, the less we own, the less we have to move, the simpler we can live. The new motto arising for American living: 'Living Well with Less'. 'The fact that people are no longer tied to specific places,... means that there is a huge drop in demand for traditional, private, enclosed spaces.' (The New Oases, 2008)

The new ideals of the modern American living and working today provide opportunity for the design of functional spaces, furniture, and product design to accommodate the new way of life.

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## RITSY: FLAT-PACK FURNITURE FOR THE URBAN NOMAD

### **I. Design Problem**

Today modern technology has allowed us the choice of vast geographical locations for living and working. About 1 in 6 Americans move each year. The highest mobility rates are found for young adults, ages 20 to 24 who were associated with over one third of the entire moving population, in a single year. [Hansen, 2008] The Americans of today enduring this behavior pattern are termed Urban Nomads. The ideals of such a person and behavior rest in the ability to live simply for the sake of mobility. The combination of our economy today, the exceedingly important environmental issues that arise, and the ongoing ideals of the Urban Nomads have led us to question, ‘Can I do without it?’ ‘Can I do with less?’ because, the less we own, the less we have to move, the simpler we can live. The new motto arising for American living: ‘Living Well with Less’. ‘The fact that people are no longer tied to specific places, means that there is a huge drop in demand for traditional, private, enclosed spaces.’ [The New Oases, 2008] The new ideals of the modern American living and working today provide opportunity for the design of functional spaces, furniture, and product design to accommodate the new way of life.

### **II. Justification of the Problem**

‘We need to be more practical in our living practices. The generation of the Baby Boomers wants to downsize, and young eco-minded adults just want cool stuff, not necessarily the square footage.’ [Koch, 2009] In 2002 the average size of a new house

increased from 1,100 square feet in the 1950s to 2,340 square feet in 2002. [NAHB 2003] The average household size has dropped from 3.67 members in the 1950s to 2.62 in 2002. With the recent economic meltdown Americans are encouraged to reassess their life-style factors and focus on what they need, not what they think they need. In essence, think like an Urban Nomad.

Nomadism changes our way of living. The ability to convince Americans to downsize is to evaluate the function of products utilized daily in regards to fulfilling the needs of the user. The ability to produce products and living spaces that successfully meet such criterion allows Americans to 'live well with less'.

Flat pack furniture is a valid design response to the Urban Nomads of our country. Flat pack furniture, also known as knock-down or ready-to-assemble [RTA] furniture, is furniture that is shipped and purchased flat, contains multiple pieces and requires assembly on behalf of the consumer.

The concept of flat-pack furniture can be used as a fundamental ruling to create new designs that are new, innovative, and accommodate the new way of living; that is simple, smaller, and nomadic, while maintaining the essence of flat-pack furniture principles simplicity and functionality.

### **III. Development of the Research Idea**

#### LIFESTYLE

##### *Urban Nomads*

We are nomads. Modern technology today has allowed us the choice of vast geographical locations for living and working. About 1 in 6 Americans move each year.

The highest mobility rates are found for young adults, ages 20 to 24 who were associated with over one third of the entire moving population, in a single year. [Hansen, 2008] The Americans of today enduring this behavior pattern are termed Urban Nomads. 'A sense of bewilderment, wonder and uncertainty reveals a nomadic culture in which we each move with our particular baggage and histories.' [Cresswell, 1997]

The term Urban Nomad is not new to our society. The Urban Nomad movement had thought to have started in the 1960s and quickly tailed off by the late 1970s. [Hunting, 2003] The ideals associated with the movement were that of 'living light for the sake of mobility, ... the Urban Nomadics movement was not about design style of theory but rather about a culture of appropriate technology.' [Hunting, 2003] The movement was associated with the 'youth culture'; consequentially there is little corresponding information.

Three designers, Ken Isaacs, James Hennessy, and Victor Papanek, in the 1970s did, however, apply ideals from the Urban Nomads. The idea of nomadic furniture did not start with these designers however. The Egyptians had stools, folding beds, x-shaped chairs; which were later adopted by the Romans that have transformed through many years to stools cots, and folding chairs accustomed to today's society. Although the designs from early history, as well as Issacs, Hennessy, and Papanek's designs for an Urban Nomad, have recently begun to circulate in a minimal manner through the design community today.

Nomadism changes our way of living. 'The fact that people are no longer tied to specific places,... means that there is a huge drop in demand for traditional, private, enclosed spaces.' [The New Oases, 2008] The new ideals of the modern American living

and working today provide opportunity for functional spaces, furniture, and product design to accommodate the new way of life. ‘Flexibility in living is what separates successful spaces from unsuccessful ones.’ [The New Oases, 2008]

### *Smaller Is Better*

Large houses are a status symbol. The average size of a new house increased from 1,100 square feet in the 1950s to 2,340 square feet in 2002. [NAHB 2003] The average household size has dropped from 3.67 members in the 1950s to 2.62 in 2002. With these two variables, the average square foot per person throughout these years has increased by a factor of three. [Wilson & Boehland, 2005] We have come to realize, with larger homes comes larger responsibilities. Square footage increases not only are a cost to the homeowner’s checkbook, but also add to the cost of environmental impacts associated with resource consumption, land development, energy use, and the list continues.

Recently the status symbol of large houses is in question. The combination of our economy today, the exceedingly important environmental issues that arise, and the ongoing ideals of the Urban Nomads have lead us to question, ‘Can I do without it?’ ‘Can I do with less?’ because, the less we own, the less we have to move, the simpler we can live. The new motto arising for American living: ‘Living Well with Less’. [Koch, 2009] ‘The trend away from bigness—and appreciation for inexpensive, well-designed, and compact living spaces—has manifested itself in other ways over the past year.’ [Flint, 2006]

American families are being encouraged to build better, not bigger. The issues of

today need people to reassess their life-style factors and focus on what they need, not what they think they need. A return to common sense and what really matters is the issue of today's dwelling units. Simplification and understanding is the underlying factor when focusing on home environments, resulting in a comfortable and responsible home. Furniture and product design must acknowledge the factors of American lifestyle today. Described below are design characteristics to make the most of small spaces based on the ease of flexibility and change: [Linman, 1977, Parikh, 1994]

- + Foldable, Moveable, Stackable Furniture
- + Foldable, Storable Room / Screen Dividers
- + Small-Scale, Rolled Storage

### *Reduce Reuse Recycle*

The not-so-interchangeable terms sustainable, green, and environmental.

Modern society has become enamored with the idea of environmentally friendly products, green products, sustainable products. But are these terms actually understood? Is it clear to the public what they are buying into or living by? It is time, now, to clear up the confusion of the not-so interchangeable terms. The following terms are defined as follows:

*Sustainable design* – is a macro perspective on environmental responsibility. [Jones, 2008] When one speaks of sustainable design, it is not only for the 'right-now' use, but rather the choices made today that will have a direct effect for future generations and the future state of the environment.

*Green design* – is a micro perspective on environmental responsibility. [Jones,

2008] When a designer acts by part of green design, it is a conscious decision of choices made today directly affecting the lives of people in their environment tomorrow. This is to make sure that the health and safety of people are not being compromised currently by design choices made currently.

*Environmentally Responsible Design [ERD]* – is a combination of micro and macro perspectives on environmental responsibility. [Jones, 2008] This is merely to say that when a designer makes a decision, it is a deliberate act on behalf of the environment and person's health and safety - today, tomorrow, and for future generations to come.

The brief history of Environmentally Responsible Design. The jargon used today: sustainable, green, and environmentally responsible design is not new to our society. Though currently we have come to hear these words frequently, they come from a long history of awareness, that until recently, had not bled into mainstream lingo. The following is a brief synopsis of the development of environmentally responsible design that society has come to hear so much about.

Long before the big boom of the Industrial Revolution, societies produced goods that were made locally and utilized materials that were local and readily available. The founders of the British Arts and Crafts movement [1850 – 1914] foresaw environmental issues associated with new industries that were producing low quality – mass-produced items that were resulting in environmental damage. This led the movement to consider more effective and responsible ways to mass-produce goods, resulting in a lower impact on the environment. The idea did not prosper during the time but it has been noted as the

beginning foundation for future movements such as the Bauhaus, De Stijl and other modernist movements. A common thread tied all of these movements together, which was: simple forms and limited materials that could be mass-produced to a high quality.

In 1927 Marcel Breuer saw opportunities in flat-pack chairs. He noted that it would save on transportation energy, they were durable, inexpensive, and could be obtained by the masses.

In 1945 – 1950 most of Europe was victimized by material and energy shortages. These impacts led to a unified thinking of ‘less is more’.

In 1960 the Hippie movement questioned consumerism and looked back to nature, from which a nomadic lifestyle arose.

In 1962 Rachel Carson’s ‘Silent Spring’ brought attention to the environmental costs of widespread pesticide use. This book was considered the start of a much larger awareness in sustainability. The issues became grounded in the 70s, 80s and on.

In 1970 the Environmental Protection Agency [EPA] was established. Environmental pollution was a rising concern. The mandate of the EPA was to ‘protect human health and to safeguard the natural environment – air, water, and land – upon which life depends.’

In 1971 the first energy crisis happened. By 1974 a Barrel of oil hit an all time high. Designs for products that consumed less energy quickly arose, such as passive solar and active solar designs, as well as the beginning of wind power. This also resulted in the first attempt of tracking the life of a product and consequent energy requirements. Now known as [LCA] Lifecycle Analysis. Today this method has now been developed

to examine the life of the product by energy, material inputs and environmental impacts.

Through the 1970s a more conscious relationship between society and the environment developed. 'Bicycling, recycling, vegetarian diets, and composting became part of the social fabric.' [Jones, 2008]

In 1978 Victor Papanek turned to the designers for the responsibility of environmental worries and impacts; stating the seven steps that contribute to 'Pollution through Products' in his book 'Design for the Real World':

1. Natural resources are destroyed; moreover, these resources are usually irreplaceable
2. The very destruction of these resources by strip-mining, open pit mining, and so forth, creates a pollution phase [1 and 2 form phase I]
3. The manufacturing process itself creates more pollution [phase II]
4. This same manufacturing process also brings about worker alienation and anomie.
5. Packaging [this is essentially a repetition of phases I and II]
6. The use of the product creates a more pollution and user alienation and user anomie [phase III]
7. Finally, discarding the product creates even more lasting sources of pollution [phase IV]

In 1987 the United Nations defined sustainable development by – 'Meeting the needs of the present without compromising the ability of future generations to meet their needs.' Two fundamental concepts arose from the defined term. 1. The fair and just

intergenerational allocation and use of natural resources. 2. The preservation of ecosystems across time. [Jones, 2008] The outcome was awareness to the general public, which then spurred on designed products responding to these issues.

In the early 1990's IDEMAT LCA software provided single eco-indicators to 'measure' the overall impact of a product. Today multiple packages that rate the LCA [Lifecycle Analysis] and LCI [Lifecycle Indicator] can be used to help designers make decisions that will minimize the impact on the environment.

In 2000 the U.S. Green Building Council [USGBC] launched the LEED [Leadership in Energy and Environmental Design] Green building Rating System. The USGBC is 'the nation's foremost coalition of leaders from across the building industry, working to promote buildings that are environmentally responsible, profitable, and healthy places to live and work. [USGBC 2005]

In 2005 on World Environment Day the United Nation's Plan for the Planet focused on 'Green Cities' promoting the importance of urban environments and actions to take to ensure a healthier planet for the future. Even though cities only use 2 percent of the Earth's land surface they consume 75 percent of the Earth's resources. [Jones, 2008]

Product design today must look at the way we use our resources, how we live – what we need to live, and how we can make these products in our lives more efficient. Efficiency in this term is conscious of design aesthetic, environmental concerns, and the usability of the product.

### *Lifecycle Analysis*

William McDonough defines ‘Environmental Intelligence’ as ‘The process of using natural resources, energy, and technology, efficiently and appropriately, in a closed-loop manufacturing cycle, to ensure that damage to the environment is avoided when bringing products for the built environment to the market.’

The lifecycle analysis is currently the most effective measure of sustainability. It is a tool for designers to use to help evaluate the impact of a material or product on the global environment. The result of the material or product can be one of two things:

*Cradle to Grave* – ‘A material or product up to a point of disposal’ [Pilatowicz, 1995] This consumes time, energy, and material to produce or manufacture objects and products with the final resting place being a landfill, incinerator, or other form of material grave.

*Cradle to Cradle* – ‘If a material’s or product’s life does not end with disposal, but through Recycling processes becomes the source of a new product.’ [Pilatowicz, 1995] The idea is to use nature as a model.

The lifecycle analysis takes a look at every stage a material or product goes through which are, extraction or acquisition of the raw material, production processes, transportation/distribution, packaging, use, disposal or reuse/recycling. [Pilatowicz, 1995]

## **VI. Design Issues**

### *Good Design*

What is good Design? In March of 2009 Metropolis magazine reflected on the

design industry to ask themselves, What is Good design? This question stems back from the 1951 Museum of Modern Art [MOMA] Good Design Exhibition. Looking from the past, present and future a consensus lay in 10 criterion for good design. Good Is: Sustainable, Accessible, Functional, Well-Made, Ergonomic, Enduring, Socially Beneficial, Beautiful, Affordable, Emotionally Resonant

It is understood that a single design or product cannot portray all 10 characteristics. Designs can be thought of as arguments. There will always be some disagreement on the ability to achieve these 10 characteristics as well as others. However if a healthy argument and intrigue can arise from a made object, then on some level it has achieved success. Horst Rittel argues, 'A design problem keeps changing while it is treated, because the understanding of what ought to be accomplished is continually shifting. Learning what the problem is, *IS* the problem.'

Design is the primary underlying matrix for life. [Papanek, 1984] Because design is an integrated part in life, there are reasons we find joy in nature. Nature upholds economy of means, simplicity, elegance, and the essential rightness to be there. [Papanek, 1984] These are all elements that continually strive to be achieved through design within our daily lives. Victor Papanek believes there are 6 criteria that must be evaluated when it comes to a design, all six evolve around its ability as a function within our lives: Method, Association, Aesthetics, Need, Telesis, and Use.

Through exploring these 6 criterion it is believed that an evaluation of a single design can be identified as good or bad, practical or impractical, aesthetically pleasing and so on.

Theorist Richard Buchanan identified 3 rhetorical characteristics of a products design:

*LOGOS*, or technological reasoning, is the clarity of its function

*ETHOS*, or character, how it reflects its maker

*PATHOS*, or emotion, how it persuades its potential users that it is desirable or useful to them [Hall, 2009]

### *Key Movements*

Take a look at the past. It is understood that designed objects of today are iterations that have been informed by designs of the past. It is important to look at and understand major design movements [that correspond with a designers personal aesthetics] in history to interpret the ideals that were put forth, molding them for the design problems designers currently face.

#### Modernism 1880-1940

Modernism was a major design movement in the twentieth century. The designs were a response to the industrial revolution. After WWI many European cities needed to be rebuilt and much discussion of how the new cities were to be portrayed was up for debate. The result was modernism. The movement can be characterized by designs that were undecorated, simple in form, smooth finishes, and minimal surface modeling. [Bhaskaran, 2005] The ideals of the modern movement are carried throughout the twentieth century branching off into more specific time periods of aesthetic style and development of forms.

#### De Stijl 1917-1931

The De Stijl movement was created by a group of artists, architects, and writers in Leiden, a Dutch city. The De Stijl motto was 'The New Design' [Mang, 1978]. The

objectives for the movement were to be nothing less than a ‘radical renewal of art’.

In all made objects, the cube was revered as the single most important form. Geometric shapes and primary and non colors were standards with that to uphold. The furniture produced in the period is one of simplicity that could have easily been mass produced and affordable to the general public. The resulting aesthetic language was in favor of logical style, emphasizing construction and function – that of which would be appropriate for every aspect of modern life. [Bhaskaran, 2005]

#### The Bauhaus 1919 - 1933

In 1919 Walter Gropius founded the German Bauhaus, a design school. The basis of teaching practice emphasized the political responsibility of designers. [Mang, 1978] This was accomplished by ‘uniting the Constructivist ideas that had come out of revolutionary Russia with the approach of Dutch De Stijl.’ [Mang, 1978] Gropius wanted to merge the artist and the craftsman. He highlighted the importance of hands on approach allowing the students to touch, mold, and ultimately understand the material and construction of designed objects as well as having the knowledge of design theory. [Mang, 1978] The Bauhaus is revered as one of the single most important movements for the marriage between art and the machine. [Bhaskaran, 2005] The school is marked in history as having the most influence on design aesthetics. During the 14 years it was open the school came to prove that design was not just an applied art, but rather an integral part in the production process. [Papanek, 1984]

#### Minimalism 1967-1978

The term minimalism was used to describe New York artists Robert Morris, Dan Flavin, and Donald Judd. [Bhaskaran, 2005] The artists work were characteristic of a

stripped-down form, overtly simplistic, using geometric forms as the basis.

Minimalism can be viewed as a term rather than a movement, in which today can be used to refer to anything from fashion - music - architecture and anything in between.

### *Flat-Pack Furniture*

The world is flat. Flat pack furniture, also known as knock-down or ready-to-assemble [RTA] furniture, is furniture that is shipped and purchased flat containing multiple pieces and required assembly on behalf of the consumer. As many have joked and discussed when it comes to such products, 'Some Assembly Required'. Flat pack furniture is notorious for assembly nightmares. This is due, in part, to the numerous flat parts, fasteners, screws, fixings and vague directions to help aid the process.

Flat pack furniture benefits are its space efficiency, significant savings for the manufacture by reducing factory assembly, shipping and storage costs. Cost saving benefits by the manufacturer directly impacts the consumer through less expensive merchandise. The downside, depending on construction techniques used, is that the furniture may or may not break back down to be moved and assembled again.

Two companies in the early 1900s competed in the market of knock-down furniture; The Brooks Manufacturing Company of Saginaw, Michigan and The Come-Packt Furniture Company of Ann Arbor, Michigan/Toledo, Ohio. [Clark & Thomas-Clark, 2001] The companies stood apart from any other competitor at the time because of their product lines consisting of all knock-down furniture. Both lines were limited to basic pieces but could furnish every room in the house with what was available.

Stated below, one of the Brooks pamphlets describes the pride that was portrayed of

delivering heirloom quality furniture:

‘Supplying the shaped, machined, finished parts, assembled in sections, so that, together with the wax and stain, it can be shipped direct to you in a compact box, you simply putting the joints together in the grooves provided, applying the quick-drying stain as directed—just a little effort, a pleasant form of recreation – thereby eliminating the numerous margins of profit that keep adding to the selling price of any commodity in its long routine from the producer to the consumer. The work of putting the sections together is simple. It can be done by any woman. There is no skill or special knowledge required. There are no holes to bore – no sawing – no pieces are glued and put together in the factory. The only tools required are a hammer and a screwdriver.’ [Clark & Thomas-Clark, 2001]

Both companies were illustrating the idea of affordable and direct service that had yet to be offered of the time. Their ideals rest on functional and simple design, material and construction. Because they standardized patterns and used machinery, they were able to lower prices to be affordable to the middle-class family. To no surprise many complaints were expressed of the ‘cancerous’ growth that would occur from these two companies. [Clark & Thomas-Clark, 2001]

The two companies close proximity to one another and many unsupportive furniture dealers close by diminished the company’s ability to flourish. Come-Packt Furniture Company had disappeared in 1918, while Brooks Manufacturing Company remained in business until 1922, when it declared bankruptcy. [Clark & Thomas-Clark, 2001]

Although the concept of flat pack furniture started in the early 1900s, the concept

did not proliferate until the 1950s. Gillis Lundgren, who was a Swedish furniture designer, came across the idea when he needed to fit a table into his car. According to multiple reports, he broke off the legs of the table so that it would fit in his car to take home. Once he was at home, he reassembled the table legs. He discussed the idea with his employers at IKEA. IKEA built their entire business around this concept, and today is known as the leader in affordable flat pack furniture.

Many companies have followed suit when it comes to flat pack furniture. The ideals are consistent:

- + SIMPLICITY in manufacturing, storing and shipping
- + FUNCTIONALITY to manufactures, merchants and consumers

### *The Machine*

The age of the machine. The machine is defined as any electronically controlled device used in fabrication and mass production as a tool to aid in the making of a designed product. Henry Ford in 1908 was determined to produce a simple and affordable car for the people, thus he introduced the Model T and the assembly line. His ideas revolutionized the world we live in today. In later years, the machine produced products quickly rose after WWII when there was a demand to serve basic living needs for much of the United States, with little money to obtain such items. Hand crafted techniques were not practical nor had the ability to meet the price-point of the average persons' need. 'The necessity for honest design [design-in-use versus design-in-sales] imposed a healthier discipline than that of the marketplace.' [Papanek, 1984]

Walter Gropius and the Bauhaus are considered the enablers for the machine to

play a role in architecture and the related fields. [Merkel, 2006] This allowed for the industrial aesthetic to move its way into design. With such ideals this meant that fabricating products became an integral part of design. The products created were visually simplistic, stripped away of unnecessary decoration, ending in a more honest result.

Fabrication is to devise, compose, frame-out, and construct. [Mori, 1998] It is separate from manufacturing which is to mass-produce. Mass production is the process after a design has been formulated, where it recreates the design multiple times over, providing a product for the mass. It has been argued that the machine has transported us to a society where the 'craftsman and the craft' of an object is lost. It is important to note that fabrication is connected to the design process. It is creative, continuous, thought provoking, intuitive, and in the end produces a single chosen result. Design cannot be overdrawn by the technological machines of today. The vast abilities to observe, imagine, associate, feel, accommodate are inherent in the designer. Machines are tools that merely aid in the process, allowing a designer to have more readily available techniques at their disposal. Technological advancements are today a practical way to conduct the design process.

Fabrication, the machine, and mass production have provided us with better goods. They have allowed us to be more efficient in functionality and reduces waste. Frank Lloyd Wright once stated, 'The machine has imbued craft with a soul.'

### *Sustainable Product Design*

The need to design a plan. Seventy percent of the overall impact of a product is

determined in the design phase. [SPD, 2005] One could conclude from this statement that design defines a products' life cycle and associated impacts on the environment. If a design improvement is made in the design process, it means that environmental performance can be improved. [Frei, 1998] Eco-effective product design is the production of goods and services which meet human needs while reducing environmental impacts. [Cooper, 1999] Thus, the goal of eco-effective product design is to bond environmental management and product design. This means that a prolonged product life, the avoidance of hazardous materials, reduction of emissions during manufacture, dematerialization or recycling implementation would be characteristics of such marriage. [Frei, 1998]

However, today it is thought that manufacturing and mass-production is more concerned with the business side; keeping costs low. When accounting for sustainability in a product, it is near impossible to accommodate for. It is understood that 'sustainable' is not cheap for business, but as stated it is because the design process did not take necessary considerations up front. Sustainability cannot be an add-on; rather it must be a condition in which to design for. [Cramer, 1997; Frei, 1998; Walker, 2006; SPD, 2005] Thus, the only way one can achieve a sustainable product is to begin with the end in mind. This means sustainable approaches consider place, time, environment, culture and knowledge. [Walker, 2006] Each solution varies as a result of these respective elements. Because of this, sustainability is an ever-changing unfocused goal. Current approaches deal with life cycle assessment, product longevity, design for disassembly or the use of recycled materials.

When it comes to manufacturing it is easy to let sustainability walk out the door

because of the disconnect harboring the business. Little decisions add up that don't directly impact oneself so it is near impossible to understand and see the harmful impacts created because of the decisions made. Knowing this now provides more compelling reasons to make sustainable decisions for product design, development, production, and sales

The following are five principles of sustainable product design that must be accounted for in order to achieve success:

1. Concentration on the product function – the environmental impact must be associated with the product's function as discussed above.
2. Consideration of the whole product system – this refers to the product life cycle
3. Consider environmental impacts – analysis of similar products in the existing market can help to produce projected impacts of the designed product.
4. Consider environmental requirements from stakeholders and the company – requirements of stakeholders must be met in the designed product [Cooper, 1999]
5. Integration into the design process – environmental components are imbedded into the designing process [Frei, 1998]

The following are five categories from the analysis of a product design that can be strategies used when designing a product:

1. Production of material – consumption of material has the largest impact on the environment, the main issue is material reserve depletion and emissions released

into the air during mining

2. Manufacturing processes – consumption of energy and resources during production as well as toxic chemical utilized in processes
3. Transportation – from material extraction, production to sales a product covers considerable distances, the impact of such process is an important consideration
4. Use of Product – acknowledges the products contributions and possible energy and material consumption needed throughout its use
5. ‘End of life’ – acknowledges the expected time frame of a product, as well as its means of disposal, or the potential of recyclability [Dahlström, 1999]

Characteristics of sustainable product design solutions must include:

1. Inventiveness and Improvisation – to design resourcefully
2. Aesthetic Longevity – to consider designs that could stand the test of time and fashion
3. Energy & Resource Use – to use minimal to no new resources, with little impact to the environment
4. Local Manufacture – make use of ready-made and locally available material, resources, and mass-production purposes
5. Necessity or Direct need – produce products that serve a purpose

## **V. Restatement of Research Problem**

**IF:** A person evaluates their lifestyle and bases their living situation on what they really need, not what they think they need – for the sake of simplicity, economy and environmental concerns.

**THEN:** A person will find oneself connecting and mimicking the value system and lifestyle of an Urban Nomad.

**PROBLEM:** A person that lives the lifestyle of an Urban Nomad needs furniture that will accommodate two possible issues. The first is the ease in moving belongings to another living location. The second is the ability to store or fold up furniture that is not in use for the optimization of limited space.

## **VI. Research and Design Implementation**

1. Look at PRECEDENTS for design. What has been done? What is lacking?
2. What MATERIALS can be utilized? What is practical? What is aesthetically pleasing?
3. How to design for the user: ANTHROPOMETRICS. What are suitable dimensions? What is comfortable?
4. What PACKAGING METHODS can be used for designed products? What is economical? What is environmental?

## VII. Terms

**Accessible** – a general term used to describe the degree to which a product, device, service, or environment is accessible to as many people as possible.

**Anthropometrics** – the science of the measurements of the various human physical traits, such as size, motion limitation, body form, mobility, strength and other similar characteristics

**Bio-based** – is a product that is made from biological [living] source, an example would be soybeans

**Biodegradable** – is a product that can be broken down by other living organisms that exist in nature.

**CNC machine** – computer numerically controlled machines are programmed and controlled by a computer so to offer very short set up times and the flexibility to run batches from one off to several thousands

**Cradle to Cradle** – a material or product that does not end with disposal, but is rather recycled and regenerated for future use

**Cradle to Grave** – a material or product that consumes time, energy, and material to produce or manufacture with the final resting place being a landfill, incinerator, or other form of material grave.

**Eco-effective** – is the production of goods and services, which meet human needs while reducing environmental impacts.

**Environment design** – is the incorporation of anthropometrics in an approach that considers the human factors within the designed objects

**Environmental Intelligence** – ‘the process of using natural resources, energy, and technology, efficiently and appropriately, in a closed-loop manufacturing cycle, to ensure that damage to the environment is avoided when bringing products for the built

environment to the market.

**Environmentally Responsible Design [ERD]** – it is a deliberate act on behalf of the environment and person's health and safety – today, tomorrow, and for future generations to come

**Ergonomic** – the applied science of equipment design to accommodate the human need

**Fabrication** – to devise, compose, frame-out, and construct

**Flat pack furniture** – a term for furniture that is shipped and purchased flat contains multiple pieces and requires assembly on behalf of the consumer

**Green design** – it is a conscious decision of choices made today directly affecting the lives of people in their environment tomorrow.

**Knock-down furniture** – a term for furniture that is shipped and purchased flat, contains multiple pieces and requires assembly on behalf of the consumer

**Lifecycle Analysis [LCI]** – an analysis that takes a look at every stage a material or product goes through which are, extraction or acquisition of the raw material, production processes, transportation/distribution, packaging, use, disposal or reuse/recycling.

**Machine** – is defined as any electronically controlled device used in fabrication and mass production as a tool to aid in the making of a designed product

**Mass production** – is the process after a design has been formulated, where it recreates the design multiple times over, providing a product for the mass

**NDA agreement** – also known as a confidentiality agreement, is a legal contract between at least two parties that outlines confidential material, knowledge, or information that the parties wish to share with one another for certain purposes, but wish to restrict access to by third parties

**Non-biodegradable** – a product does not break down in a sufficient amount of time it is

considered non-biodegradable.

**Ready to assemble [RTA]** – a term for furniture that is shipped and purchased flat, contains multiple pieces and requires assembly on behalf of the consumer

**RFQ** – request for quote is a document issued when an organization wants to buy something and chooses to make the specifications available for companies to submit bids

**Sustainable design** – it is not for the ‘right now’ use, but rather the choices made today that will have a direct effect for future generations and the future state of the environment.

**Urban Nomad** – a young city dweller, usually aging from 20 -30 having habits of moving residential living locations at a high frequency

**Urban Nomadics movement** – a movement that started in the 1960s associated with the youth culture with ideals of living light for the sake of mobility

**Usability** – is defined by the ISO 9240 standard as ‘a product’s usability is determined by the efficient effectiveness and satisfaction with which a specific set of tools can deal with a specific set of tasks in a given environment.’

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