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### SAFE AGING IN PLACE; THE CRITICALITY OF BUILDING APPROACHES FOR BETTER LIVES

RANDA BOUKHARI PhD Candidate, Faculty of Architecture - Design & Built Environment  
*Beirut Arab University, Lebanon*, [randa.boukhari@gmail.com](mailto:randa.boukhari@gmail.com)

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## SAFE AGING IN PLACE; THE CRITICALITY OF BUILDING APPROACHES FOR BETTER LIVES

### Abstract

Safe aging in place became an important topic in today's residential architecture, especially after defining the home environment and its surrounding as an environment that threaten the wellbeing of the elderly by exposing one third to two third of this collective to falling accidents. This fact oriented this work to develop checklist of international and national design guidelines (n=2), to highlight first, the design standards according to the elderly with sensory, physical, and cognitive age-related impairments and, to categorize them as (informative and/ or safe) elements; second, to quantifies the architectural shortage in Lebanese buildings and houses approaches for their criticality in promoting safe accessibility and defining the wayfinding. To fortify the validity of these checklists, two international inclusive case studies" MISS Sarg Fabric-Austria" and "Siple House- Canada" representing two major types of contemporary building models (multi families and single-family models) were re-assessed. The results justified the validity and quantified these case studies abilities to protect the elderly well-being by "91 % for multi families model" and "78% for single family model". alternately, this checklist identified and quantified the shortage in the Lebanese case studies by (78%)in the case of" Sakr building" and (64%)in the case of "Hammoud House". At the end, it was found that adopting the concept of universal design is ideal.

### Keywords

Elderly, universal design, building approach

# SAFE AGING IN PLACE; THE CRITICALITY OF BUILDING APPROACHES FOR BETTER LIVES

RANDA BOUKHARI <sup>1</sup>

<sup>1</sup> PhD Candidate, Faculty of Architecture - Design & Built Environment, Beirut Arab University, Lebanon

**ABSTRACT:** *Safe aging in place became an important topic in today's residential architecture, especially after defining the home environment and its surrounding as an environment that threaten the wellbeing of the elderly by exposing one third to two third of this collective to falling accidents. This fact oriented this work to develop checklist of international and national design guidelines (n=2), to highlight first, the design standards according to the elderly with sensory, physical, and cognitive age-related impairments and, to categorize them as (informative and/ or safe) elements; second, to quantifies the architectural shortage in Lebanese buildings and houses approaches for their criticality in promoting safe accessibility and defining the wayfinding. To fortify the validity of these checklists, two international inclusive case studies "MISS Sarg Fabric-Austria" and "Siple House- Canada" representing two major types of contemporary building models (multi families and single-family models) were re-assessed. The results justified the validity and quantified these case studies abilities to protect the elderly well-being by "91 % for multi families model" and "78% for single family model". alternately, this checklist identified and quantified the shortage in the Lebanese case studies by (78%)in the case of " Sakr building" and (64%)in the case of "Hammoud House". At the end, it was found that adopting the concept of universal design is ideal.*

**KEYWORDS:** *Elderly, universal design, building approach.*

## 1. INTRODUCTION

The concept of "aging in place" reflects a new living phenomenon in the western societies since (1980's). it interprets a contemporary socio-political and socio-economic solutions toward the western aged population as a respond to the individuals' demand, sudden increase in life expectancy, and the rise cost of nursing homes (Vasunilashorn et al. 2011). whilst, this living model is rooted in the Lebanese history, it reflects the societal culture, beliefs, and values (Abdul Rahim et al., 2015). Home, from the Lebanese perspective, is considered an ideal institution for socialization and maintaining family networking among the elderly who are the head of the family, descendants, relatives, and the community (Abid, 2015). Studies asserted that aging increases the risk of falling accidents (WHO, 2017 2018; Al Faisal, 2016). Statistics indicate that (1/2) to (2/3) of these accidents occur in the home environment and its surrounding as an output of the age-related sensory, physical, and cognitive impairments that threaten (1/3)of the aged populations worldwide(WHO, 2017-18; Davis et al., 2009) , and the inadequate home physical settings such as skid surface materials, inadequate height of thresholds, narrow pathways, absence of handrails and nosing at stairs (WHO, 2007 2018; Al Faizal, 2016; Stub and Haslam, 2005). as a result, aging in place is socio-political, socio-economic, and socio-cultural principles in a three-dimensional living space and, at the same time, in a case of an inadequate home environment, threaten the healthy living and the well-being of the elderly. At this stage, two major questions are imposed" what are the design required for safety?" and " are these standards developed to meet the need for safe navigation and place identification?"

The concept of accessible and inclusive design, or design for a list restrictive environment are solutions to modify the unsafe environment by providing obstacle free spaces and places for independent mobility and usability for all persons with different age, gender, and abilities (Wilm and Noe, 2008). but, the elderly' critical age-related disabilities and diseases could create a great challenge to these standards and require further studies to provide a better quality of living models such as in the case of decreased working memory where Biopsychological studies found that the working memory decreases with age (Davis et al., 2009; Head et al., 2005) and, Decreasing in working memory means a smaller amount of environmental information is taken in and less information is eventually encoded (Davis et al., 2009). Moreover, information should be salient and distinctive in color, texture, size, shape, etc. to be encoded (Davis et al.,

2009; Caduff and Tempf, 2007). This fact indicates that the aged group (65+) are at higher risk to experience “falling accidents” and getting loss” in familiar and unfamiliar environment which prioritize investigating the quality and quantity of the design elements provided at building approaches to be the research main goal for their critical role in protecting or threatening the well-being of the elderly.

## **2. METHODS**

Multi-disciplinary data resources, the research questions and objectives, have shaped the quality and the quantity of methods required in this work(checklists(I&II) were developed, and international and national case studies (n=4)) were selected and assessed for the purpose of this work.

### **2.1 The Checklists (I &II)**

In Checklist (I); the design guidelines for safe and informative building approaches have been identified and organized as “standards of parking areas, setting down points, horizontal circulation, vertical circulation, and building entrances”; they have been selected according to quality of age-related disability they serve. their identity as “safe and/or informative” standards has been identified. This identification was critical in the safe aging in place saliency assessment. Checklist (II) contains the same organized standards, it quantified the degree of safety and the informative mode provided in the international inclusive case studies to examine its validity; Afterward, the shortage in the Lebanese case studies was recognized and quantifies.

### **2.2 The Case Studies (n=4)**

Two international and inclusive case studies were the specimens representing the major types of housing” the single-family housing, and the multi-families building types”, they were the key-method for checklist validity examination, and three-dimensional instructive method.

Two national case studies were the specimens of the Lebanese major building types, and architectural situations.

## **3. RESULTS**

### **3.1 The International Case Studies**

The qualitative and quantitative re-assessments of the two inclusive international studies “Miss Sargfabrik – Austria” and “Siple House – Canada” (Fig. 1 & 2) showed a great compatibility between their classification as inclusive residences and the output obtained from the checklist (1) which asserted their inclusiveness by (91% & 78%) respectively. The major point found in this re-assessment was the insufficient salient cues at buildings’ approaches (As shown in Fig. 1 & 2) & indicated in (Table 1).



Fig. 1 Salient Cues in Miss Sargfabrik  
(Austria) Reference : Miss Sargfabrik.



Fig. 2 Salient cues in Siple House (Canada)  
Reference : Siple House (2004)

Table 1: The Saliency Evaluation in International Case Studies  
Reference : The author

Salient Cues Critical Areas	Parking Area	Horizontal Circulation	Vertical Circulation	Building Entrance	Symbol	Case Studies	Ref.
Color and contrast	✓	✓	✓	✓	★	1&2	ADA, 2010 Davis et.al, 2009
Multi-sensory perceived signage	×	×	×	×		1&2	ADA, 2010 BS, 2010 Davis et.al, 2009
Multi-sensory perceived landmarks	✓ (1)	✓ (2)	✓ (2)	✓	★	1&2	Caduff, D., &Timpf, S. (2007)
Distinctive design elements	✓ (1)	✓ (2)	✓ (2)	✓	★		Stoiljkovic B., et.al, (2015)
Degree of encoding	75% (1) 25% (2)	25% (1) 75% (2)	25% (1) 75% (2)	75% (1) 75% (2)			

### 3.2 The National Case Studies

The qualitative and quantitative assessment occurred to identify the safety and saliency shortage of the architectural practices in the Lebanese case studies” Sakr multi-families building & Hammoud single-family house” (fig 3&4) recognized numerous design elements that could threaten the safe navigation and place identification of the local elderly in their intimate home environment by (78%& 64%) respectively. table (2) represents a part of the developed checklist focusing on the key-elements in the evaluation procedure.

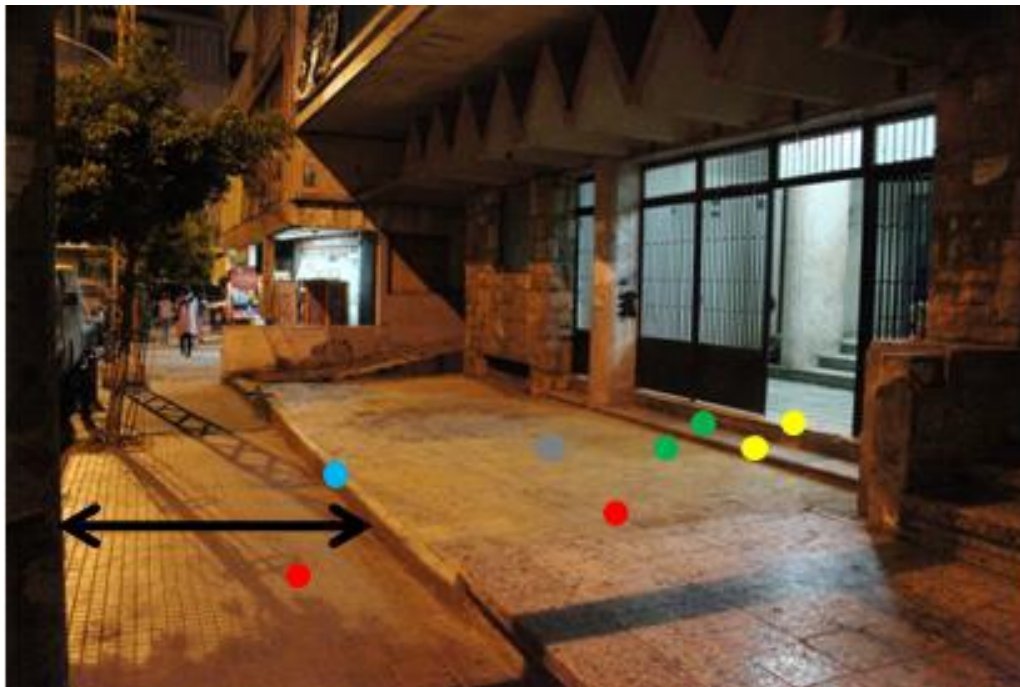


Fig. 3 The Building Approach of Sakr Building (Beirut)  
Reference : The Author, Photo by Mohamed Khaireddin, and Maha Erfan (2018)



Fig. 4 The Building Approach of Hammoud House (Mount Lebanon)  
Reference : The author, Photo by Mohamed Khairuddin, and Maha Erfan (2018)

Table 2 : Standards and Design Shortage in National Case Studies  
Reference : The author

Critical Elements Design Requirements	Standards	Practice		Symbol	Ref.
		1	2		
<u>Parking Area</u>					
Direct visibility	≤ 50 m	×	×		Dec. 7194, 2011
Safe accessibility	5.1 x 3.7 car area	×	✓		Dec. 7194, 2011
Salient cues	Multi-sensory perceptual modality	×	×		Caduff and Timpf, 2007 Davis et.al, 2009
<u>Horizontal Circulation</u>					
Sidewalk width	1.5 m min.	×	×	↔	NL. 156, 1999 UD , Booklet 1-external
Even, non-skid surface	0.45-0.6 coefficient of friction	×	×	●	ADA, 2010 Dec. 7194, 2011 Wilm & Noe, 2008
Changing in Level	Bevel (> 6mm H) Ramp (> 13mm H)	×	×	●	ADA, 2010 NL. 156, 1999
Salient landmarks	Multi-sensory perceptual modality	×	×		Caduff and Timpf, 2007 Davis et.al, 2009
<u>Vertical Circulation</u>					
Stairs and ramps	Uniform stairs S&R (> 90 cm W)	×	✓	●	Dec. 7194, 2011 ADA, 2010 Wilm & Noe, 2008 UD , Booklet 1-external
Handrails/Nosing	0.9 to 1 m above stairs floor level (Handrail)	×	✓		UD , Booklet 1-external
Color and contrast	70% difference between LRV	×	×	●	ADA, 2010 Wilm & Noe, 2008 UD ,Booklet1-external
<u>Main Entrances</u>					
In/out landings	1.5 m <sup>2</sup>	✓	×	●	NL. 156, 1999 ADA, 2010
Door clearance	2.5 x 1.2 m min.	✓	✓		NIBS, 2015
Lighting	1.5 LUX min.	✓	✓		N/A
Salient cues	Multi-sensory perceptual modality	×	×		Caduff and Timpf, 2007 Davis et.al,2009

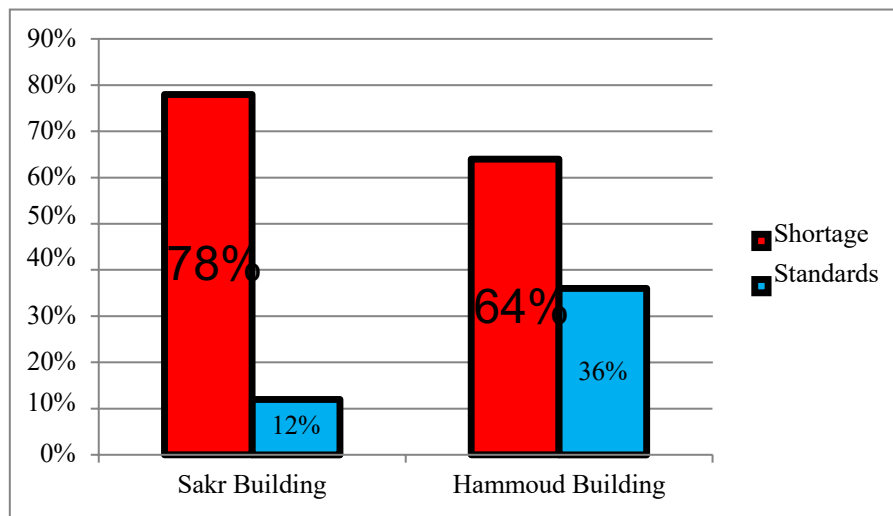


Fig. 5 The Percentage of Shortage and Standards in Each Case Study.  
Reference : The author and Maha Erfan

### 3.3 ANALYSIS

The three-dimensional evaluations occurred to identify the critical elements that could threaten the elderly' safe navigation and the wayfinding in their home environment casts light on an important misunderstanding of "aging in place" which goes beyond providing a "durable home for socialization" "" to demand for a "flexible home for a life span" that tangibly and intangibly responds to the aged population with age-related disability mobility and wayfinding needs. Analyzing "Sakr multi-families building" constructed in (1960's) and "Hammoud single-family House" constructed in (2007) reflects a continuous lack of adopting or developing the building codes and regulations to respond to the elderly biopsychological characters. This was clearly seen in the quantitative assessment of design shortage in "Sakr building" and "Hammoud house" by (78% &64%) respectively. This comparative assessment represents a three dimensional solid interpretations of the societal insight toward "disabilities" and their design standards. On the other hand, assessing the inclusive international case studies "MISS Sarg Fabric" and "Siple house" shows lack of demanding for the design criteria that could be sensually defined and cognitively encoded especially at critical environmental decision points such as the building approaches.

### 4. CONCLUSIONS

Arguing the healthy living and the well-being of the elderly in their residential settings is considered a critical issue worldwide mainly since the sudden increasing in the life expectancy. Paying attentions to the complex and distinctive bio-psychological characteristics of this collective in architecture could impose numerous questions about the contemporary portrays of residential buildings and areas in the expectancy of future fast increasing in aged population accompanied with high rate of age related disabilities and illnesses which may convert the healthy portray of an urban context into a form that reflect disability as a case of majority after being a hidden case of minority . This possibility would, if not comprehended and well architecturally interpreted, draw a morbid image of a "disable and sick" society. The elegant appearance of the international case studies "MISS Sarg Fabrik" and "Siple house" reflect the intelligence of the universal design that combines between the safe accessibility and the esthetic of the place in one uniform scene. The only disadvantage in this concept is the absence of the saliency facet as a prerequisite in the universal design. This research paper then, finds that it is critical to develop the international standards taking the cognitive impairment into account to become scientific tools by which the built environment could protect the well-being of the aged population by providing both, safe accessibility, and salient cues, especially at the building approaches, brought from their intimate environment, perceived via different sensory modality to protect this collective from getting loss in their way-finding process. This development then, could become the right methodology of developing the Lebanese building codes and regulations.



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