Dealing with Disability

In post Tsunami
reconstructed villages
Dealing with disability

While working in the villages of Karaikalmedu, Kilinjalmedu & Kottucheriymedu in Karaikal Architecture & Development realised that the needs of the disabled population were not addressed in the reconstruction effort post tsunami. This takes on a special importance as close to 10% of the population of these villages suffers from some kind of disability.

Through simple solutions, community based activities and greater awareness a lot of the difficulties faced by the disabled can be addressed.

In the new villages disabled people will be exposed to a totally new house type and the village layout;

Raised floor levels, stairs to access the same, staircase to access flat roofs, small toilets, extremely small plots of land, a rigid lay out, number of protrusions in the form of drainage chambers, septic tanks, manholes, lack of private spaces in the immediate surroundings of the house, high density of housing are some of the things that they will have to adapt to.

Even if an organisation is keen on providing disability friendly homes to families with disabled members it confronts the problem posed by the lot system of house allotment. (The houses once complete are allotted based on lots picked by the head of the family.) Hence nobody knows unless the lots are picked which house will go to the family with disabled members. Hence the immediate neighbourhood of a disabled person would change not only in terms of the physical space itself, but also in terms of the people.

There are a number of issues that need to be addressed and this manual is a small attempt at addressing them.

The disabled in India like elsewhere are innovative and given some help they will adapt to the new conditions and even demonstrate innovative solutions.

So while we all work at this let us keep a simple slogan in mind

"Not About us Without us"
(where "us" is the disabled community)
Disability in India

There are different types of disabilities that exist in a society. Census of India 2001, identified five types of disabilities. The number of disabled in each type of disability is depicted in the table below, which shows that the total number of disabled in India constitutes more than 2 percent of the total population.

### Types of Disabilities

<table>
<thead>
<tr>
<th>Types of Disabilities</th>
<th>Number of Disabled</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>1,06,34,881</td>
<td>48.55</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>61,05,477</td>
<td>27.87</td>
</tr>
<tr>
<td>Mental</td>
<td>22,83,821</td>
<td>10.33</td>
</tr>
<tr>
<td>Speech</td>
<td>16,40,888</td>
<td>7.49</td>
</tr>
<tr>
<td>Hearing</td>
<td>12,61,722</td>
<td>5.76</td>
</tr>
<tr>
<td>Total</td>
<td>2,19,06,769</td>
<td>100.00</td>
</tr>
</tbody>
</table>

### From the table it is evident that:

- More than 50% of the disabled population in Tamil Nadu are Visually Impaired.
- Around 25% suffer from Orthopaedic disability.
- About 10% have Mental disability.
- Less than 10% are Speech or Hearing impaired.
- The remaining 5% fall under other disabilities.

Census of India 2001, identified five types of disabilities. The number of disabled in each type of disability is depicted in the table below, which shows that the total number of disabled in India constitutes more than 2 percent of the total population.

- **Visual**
  - Number: 1,06,34,881
  - Percentage: 48.55%
- **Orthopaedic**
  - Number: 61,05,477
  - Percentage: 27.87%
- **Mental**
  - Number: 22,83,821
  - Percentage: 10.33%
- **Speech**
  - Number: 16,40,888
  - Percentage: 7.49%
- **Hearing**
  - Number: 12,61,722
  - Percentage: 5.76%
- **Total**
  - Number: 2,19,06,769
  - Percentage: 100.00%

### Disability In Coastal Tamil Nadu

State of Tamil Nadu*

<table>
<thead>
<tr>
<th>Types of Disabilities</th>
<th>Number of Disabled</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>24,207</td>
<td>64.82</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>6,575</td>
<td>14.12</td>
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<tr>
<td>Mental</td>
<td>2,726</td>
<td>7.3</td>
</tr>
<tr>
<td>Speech</td>
<td>2,502</td>
<td>6.7</td>
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<tr>
<td>Hearing</td>
<td>1,335</td>
<td>3.57</td>
</tr>
<tr>
<td>Total</td>
<td>37,345</td>
<td>3.22**</td>
</tr>
</tbody>
</table>

From the total disabled population in Tamil Nadu more than 60% are Visually Impaired and around 20% suffer from orthopaedic disability.

Total population of Tamil Nadu is 6,24,05,679. The number of disabled are 16,42,497 which is 2.74% of the total population.

Total population of Pondicherry is 9,73,829. The number of disabled are 25,857 which is 2.65% of the total population.

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*Directorate of Census Operation - Tamil Nadu, http://www.census.tn.nic.in/

**With respect to the total population of the district.

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*Directorate of Census Operation - Tamil Nadu, http://www.census.tn.nic.in/

**With respect to the total population of the state Tamil Nadu.
Visual Impairment
Impairment affecting sight is known as Visual Impairment. People may be partially or totally impaired. Visually impaired make use of other senses such as hearing or touch to compensate for the lack of vision. It is necessary to give instructions accessible through the sense of touch (hands, fingers or legs). They use a white cane to detect obstacles and hindrances on their way. A white cane can detect obstacles only at ground level not above eye level; therefore, a visually impaired person may bump his head or shoulder against protruding objects. Persons with limited vision may be able to discriminate between dark and bright shades and the difference in primary colours.

Orthopaedic Impaired can be divided into:
Non-Ambulatory: Orthopaedic disability that results in a person being unable to walk or move is non-ambulatory impairment. Such a person is most likely to be restricted to a wheelchair and may need assistance to move.
Semi-Ambulatory: Orthopaedic disability that cause individuals to walk with difficulty or insecurity is semi-ambulatory disability. Semi-ambulatory people include those who cannot walk without a cane and those who have some trouble in their upper or lower limbs although they can walk unassisted. Individuals using crutches, amputee, arthritics, spastics and those with pulmonary and cardiac illnesses may be semi-ambulatory.

Mental Retardation
Mental retardation is a term for a pattern of persistently slow learning of basic motor and language skills during childhood, and a significantly below normal global intellectual capacity as an adult. One common criterion for diagnosis of mental retardation is a tested intelligence quotient (IQ) of 70 or below and deficits in adaptive functioning. People with mental retardation may find it difficult to balance and have little control on their body.

Hearing Impairment:
Impairment affecting hearing abilities is known as Hearing Impairment. Like the visually impaired, people with hearing impairment may be partially or totally impaired. An individual with Hearing Impairment may feel insecure in public areas because he is unable to communicate or hear warning signals. However, they are able to use their sight to gather information in public places.

Elderly person
Elderly people on account of their old age may suffer from different degrees of orthopaedic, visual and other disabilities.

Often the question arises... "While there are many important things that need to be addressed, why should efforts be made that would benefit only few hand full of people?"
The issue of disability is one of the last few in the list of priority. However, while this manual tries to address the needs of the disabled community, the work done for the disabled community is also directly beneficial to toddlers, children, pregnant women and the elderly.

In a community at any given point of time toddlers, pregnant women and old people co-exist also the human life cycle starts from that of a toddler and ends in old age. These are fragile periods of each one’s life where a disable friendly environment would directly benefit. Therefore while reconstructing or redesigning the environment that would be used by a community it is essential to pay attention to needs of all kinds of people that exist. Post Tsunami reconstruction efforts give us the opportunity to exercise this thought, therefore it is important to see that in the benefits of the few disabled also lay the benefits for all.

A disable friendly village is a friendly village for all.
The rural disabled* persons access to resources, employment opportunities and rehabilitation is severely restricted.

...Some estimates say that almost 70-80% of Indians with disabilities live in rural areas while most of the country’s rehabilitation centres are situated in urban areas...

...a person belonging to this large segment of the rural poor is born with, or due to some unfortunate circumstances acquires, a disability, then he or she must face life with a double handicap...

...Government intervention is inadequate because the care of the disabled comes somewhat low on their agenda when compared with the more pressing problems of providing food, drinking water, health care, primary education and housing...

...They often comprise the most neglected, marginalised and unlettered of their community. They are usually denied education and the right to enjoy normal social interactions and relationships. Families rarely take the trouble to educate their disabled daughters and disabled women are not given a chance to find fulfillment in marriage and motherhood. Employment opportunities for the uneducated and untrained disabled are so limited that the disabled person is considered a burden on the family, a drain on their meagre finances...

...Most modern rehabilitation aids and mobility appliances are totally unsuitable for rural Indian conditions. Wheelchairs and tricycles are a legacy of a totally alien table-and-chair culture of the western world. Rural Tamil Nadu has a totally different social milieu as does most of rural India. It is quite literally, more down to earth, with sleeping, cooking and toilet facilities all being at floor level making the wheelchair user a total misfit in the home. The wheelchair user finds it not just difficult, but sometimes even dangerous to negotiate the sandy, uneven mud lanes in the villages independently. This is a problem that would not trouble a westerner, who has access to paved and tarmacked roads. Callipers which require special fittings and have to be taken back to the point of manufacture for repairs have the built-in disadvantage that they may be discarded once they are broken...

...there has in the last decade or so, been a shift to community based rehabilitation (CBR) in India, CBR is a process of motivating and providing inputs—which could be medical, technical or social to the community to take care of its disabled...

...The first has been the sensitizing and training of even simple, uneducated members of the community by specialists and professionals so that they can spread awareness, impart therapy and even construct and repair mobility appliances like crutches, callipers and wheelchairs...

...The second aspect has been the reaching out into rural communities to identify areas which require technical assistance or help by referral to rehabilitation institutes...

...The awareness campaign included talks to women’s groups, dialogue with respected members of the village community like school headmasters, teachers and village headmen...

...have enthused village volunteers to employ media as diverse as therukoothu (street theatre), kalakshepam, villupatu (folk song) and puppet shows to communicate messages...

...Several NGOs are encouraging village artisans to improvise their own callipers, crutches ad wheelchairs from locally available materials like wood, cane, PVC pipes and cycle components...

...In some villages, any form of disability is considered as divine retribution and a signal of God’s wrath with the erring family. In these cases there may be a great deal of resistance against rehabilitation which is construed as interference with what God has ordained. The approach used in each community must therefore be fresh, open-minded and sensitive. Preconceived notions and rigid equations that presume that there is only one correct solution to the problem of rehabilitating the rural disabled can sabotage the whole exercise of community-based rehabilitation...

**DISABLE FRIENDLY HOME**

**Entrance**

The most common problem for disabled people in accessing a building starts from the entrance. For orthopaedically disabled and mentally retarded people it is primarily due to **varying heights and lack of control on their body**. For a visually impaired the problem is due to the visual **inability to sense obstacles and find direction**.

**Do’s**
- Heights of all the steps in a staircase should be the same. (Fig 5)
- If the main entrance to a building is at a higher level then build a ramp.
- Install safety guards or railings around hazardous areas, stairs, ramps, accessible roofs, balconies and raised platforms more than 0.40 m high. (Fig 3 and 8)
- The ramp should have landings at the beginning, at certain intervals (depending on the slope) and at the end for resting, manoeuvring and avoiding excessive speed.
- Threats like pointed edges and protrusions should be removed or altered by bevelling the edge. (Fig 4)
- Set of controls to the exterior light should be near the source of light.
- Level all protruding lids and remove any protruding objects to give sufficient space for safe walking.

**Don’t**
- Do not create varying heights and levels at the entrance, people with disabilities are not able to judge the varying height of steps.
- Don’t have steep ramps and staircases.
- Surface of a Ramp should not be very smooth or of a finish that increases the chances of slipping.

**Possible ways**
- Varying level might be modified by filling it with earth or by adding stones as steps. Stones placed should not wobble, hence, should be rooted to the ground. (Fig 1 and 2)
- Try maintaining a uniform level. Difference between indoor and outdoor levels should be avoided.

**Staircase**
- For a staircase involving 2 to 15 steps, the riser height should be between 7 to 9 inches. The tread width should be 11 to 13 inches.
- Width of the step should be between 30 to 36 inches. (Fig 5)

**Ramps**
- Ramps should have a gentle slope of a maximum of 1:20 to minimum 1:12 (Meaning a ramp of 12 feet length will rise 1 feet in height).
- It should maintain a minimum width of 3 feet.
- Should have handrails on at least one side.

**Handrails**
- Hand rails should be installed at these heights (Fig 7)
  - between 0.85 m and 0.95 m (for use by semi-ambulant disabled and elderly people)
  - at a height of 0.60 m (for use by non-ambulant disabled)
  - between 0.10 m and 0.15 m; or a low curb should be installed at a height between 50 mm and 75 mm (for use by Visually Impaired)

Further Details refer to annex, page number 30

Fig 1 and 2: Big steps make it difficult for Disabled to climb

Fig 3: Blind man trying to climb stairs with railing.

Fig 4: All staircases must avoid nosing.

Fig 5: Appropriate measurement for a step

Fig 6: All Ramps and Staircases must avoid steep slopes and provide generous space landings.

Fig 7: Hand rails should be installed at these heights

Fig 8: Provide handrails and safety bars at various heights and at all danger points.
**Entrance doors**

**Do's**
- The minimum width of the door should be 0.90 m
- All entrance doors for the house should open inwards. (Fig 6 and 7)
- All handles, latches and bells should be placed at an accessible height between 0.80 m to 0.95 m (Fig 1)
- If for architectural or technical reasons the main entrance cannot be made accessible, an alternative accessible entrance should be provided.
- The colour of the entrance door should contrast with the surrounding surface so as to be distinguishable by people with sight problems, especially the old people.

**Don’t**
- No narrow doorways and entrances. They create problems when people have to be assisted into the house on wheel chairs. (Fig 4)
- No thresholds as they hinder smooth movements.
- Door mats and any slippery material should be removed, this may lead to accidents.
- No electrical mains should be near the basic switches or doorbells. These can lead to hazardous accidents for the visually Impaired or during low lighting condition. (Fig 2 and 3)

**Within the House**

- Some windows in the house should start from a minimum of 0.75 m from the ground. (Fig 5)
- All latches higher than 1.20 m on a window should be avoided.
- Provide latches and handles at the lower end of doors and windows.
- All doors should have latches between the height of 0.15 m and 0.75 m above the ground.
- All exit doors should not have locks or latches above 1.20 m.
- All exit doors within the house must open inwards.
- Door to any small room within the house should always open outwards.
- Avoid threshold and other unnecessary level changes within the house.
- The colour of all doors and windows should contrast with the surrounding surface so as to be distinguishable by people with sight problems especially the old people.
- Electrical switches should be kept at a decent height such that is accessible to an impaired person yet inaccessible to a child.
- All taps in the house should not exceed 0.80 m to 0.95 m in height.
- System of alert should be placed at all crucial corners of the house like kitchen, bathing, defecating area and living rooms etc... This system can be as simple as a bell or a gong.

**Fig 1:** An appropriate height of the latches helps a orthopaedically disabled to open and close doors.

**Fig 2:**

**Fig 4:** Small Doorways and steps become a problem for people with wheelchair.

**Fig 5:** Latches at an appropriate height help an orthopaedically disabled to open and close doors and windows.

**Fig 2 and 3:** Main electrical points should not be placed close to any switch.

**Fig 6 and 7:** Main doors opening outward may lead to accidents.
Bathing and Defecating areas usually become a problem when the space is too small or when the fixtures are not at an accessible height or distance. Indian style of defecating involves squatting; without support it is usually cumbersome to stay in that position and to rise independently.

**Reasons for need of space**
- Water containers, various other bathing and toilet related items reduce the free space for movement in toilets and bathing rooms.
- Some disabled people need assistance while bathing and defecating.
- People with orthopaedic disability use accessories like stools etc which need space.
- Therefore, it is essential to have more space in the bathing and defecating area.

**Do’s**
- A larger space for defecating and bathing should be planned. Minimum space for bathing area should be 1.35 m to 1.8 m.
- Doors should open outward unless sufficient space is provided within the toilet or bathing stall.
- Doors and windows should have a handle on the lower end of the frame.
- Handles should be placed on both inside and outside.
- Doors should be lockable from inside and openable from outside under emergency situations.
- Level all protruding drainage lids and decrease unnecessary protrusion of any taps to provide sufficient space for movement and reduce accidents.
- When the toilets and bathing area are attached, a tap should also be provided near the toilets.
- Outer part of the door should have no latches above the height of 1.2 m from the ground.
- A light switch at an accessible height should be provided inside the bathing and defecating area.
- Overhead faucets and flush tank should be a safe height.
- Provide accessible hand-operated flushing controls.
- The floor should be well-drained.
- Drain openings should be placed in a corner.
- Bathing and defecating area should be equipped with an alarm system. For example, a metal rod when banged on a steel plate will make a noise loud enough to be heard, this can be attached to the wall at an accessible height.

**Don’t**
- No shelves should be located above the wash-basin.
- Tiles or any slippery flooring should not be used.
- No thresholds

**Fixtures**
- Handles on doors and windows can be placed at the ground level or at a height of 0.80 m to 1 m above the ground level. These handles should be placed on both inside and outside.
- Latches should be placed either 0.15 m above the ground level or at an height of 0.80 m to 1 m above the ground.
- All taps should be at a convenient height of 1 m in a bathing area and 0.45 m in a defecating area. (Fig 1)

**Indian style of defecating.**
- Encourage the use of a raised stool with a hole. (Fig 4, 5, 6 and 7)
- Provide handrails and bars at various heights 0.20 m, 0.75 m, and 1.2 m height for support. These handrails and bars should be in both bathing and defecating area.
- Handrails and bars should exist on the side and front.
- Handrails and bars should be at a convenient distance. They should not be too far to access.
- They should not be too close such that it hinders movement or becomes hazardous. (Fig 8)
• Some seating arrangements should be provided at the height of 0.20 m to 0.30 m above the ground.
• All offices aiding the disabled community should be maintained at the ground level.
• Avoid threshold and other hindrances.

Levels
• All notice boards and important reading material should be accessible at a height of 0.80 m to 1 m especially in offices dealing with disability.
• Community taps and wash basins should be at height of between 0.45 m to 0.60 m above the ground.
• Next to plants we have a tendency to make small brick or stone ledges. These can be difficult to see. They can be completely avoided. A low grass hedge or 0.60 m high bamboo guard is more appropriate.
• Remove all protruding objects and provide sufficient walking space for safe walking.

Public toilets
• All toilets should be available at the ground level of a public building.
• People with disability may need help while using the toilet. They may be helped by either a man or woman. Therefore other than the Ladies and Gents toilets a third unisex toilet should be provided.
• The toilet area should be big enough to fit two people conveniently and also provide them with enough space for movement.
• Having both Indian style and western style toilets is advisable.

Community and Public Space
Uneven Surface, Obstacles and Hindrances
• Avoid uneven surface and hindrances like manholes, open drains, curbs, small stone fences around the plants, open pipes, trees with shallow roots, plants, bushes in the path of movement.
• Manholes should be properly covered and open drains should be either protected by a wall or covered by a grill work. They should be placed on the road sides if possible.
• When on the road, lids of the drainage pits and manholes should be at the same level as the surface of the road.
• Pathways used to move/travel should be kept clear of all obstacles.

Pavements
• Construct a pavement at least 1 m wide exclusively for pedestrians.
• Water should not stagnate on pavements and they should not be made with polished or slippery materials.
• The pavement should be almost at the same level as the road. If there is a change in level then instead of a curb there should be a gradual slope to connect the pavement to the road at least in front of doors and at a regular interval.
• The pavement should be clear of any plantation and other hindrances.

Resting points
• Small seating at periodic interval should be placed along the sides of the roads/pavements.
• Seating should be at two heights of 0.15 m to 0.20 m and 0.45 m above the ground.

Community centres, marriage halls, public offices, hospitals and other public places
• All counters for transactions should be accessible at a height of 0.60 m above the ground.

Fig 1: Ramps should be constructed in public office for accessibility.
Fig 2: Public seating should be provided at various levels.
Fig 3 and 4: All counters for transactions should be accessible.
Fig 5: In public places third unisex toilet should be provided for disabled people and their assistants.
Fig 6: Western toilets with handrails on the sides.
Various activities involving the disabled, their family, friends and the community in large need be undertaken to help architects, NGO's, social mobilisers understand disabled people and their needs.

**ACTIVITIES**

**Understanding disability**

*“Nothing about us, without us”*

**Few guidelines to plan and design an activity**
- Start all meetings with a fun session. Just because the meeting concerns disability does not mean it has to be serious in nature!!
- Then introduce the main objectives and aims of the meeting.

**Certain set of activities are outlined below**

The activities can be further fleshed out by the people who wish to undertake them.

**Activity 1**

**Part A:** Disabled people and their families sit together to discuss their problems.

**Part B:** A similar discussion is undertaken only with the disabled people and then with their families as separate groups. (Pic 1)

**Aim:** To get a general understanding of the various problems faced by the disabled people.

**Note:** Part B will facilitate a more personal discussion with each group feeling free to talk without fear of unintentionally hurting the other.

**Duration:** 1hr to 2hrs

**Activity 2**

People with different types of disability are interviewed separately (Pic 2)

**Aim:** To get a more personalised understanding of disabled people and their problems.

**Discuss with the people along the following lines**

a) Their disability
b) The problems they face, both physical and social
c) What can be done to improve their situation
d) What would they like to do
e) Their personal feelings about their own disability, what their family members feel of it and what the society thinks of the same

**Note:** Make sure that amongst the people interviewed there should be women, girls, the old and the young. This is important to get a good overview of the society and it’s needs.

**Duration:** 20 - 30 min per interview

**Activity 3**

Observer should visit the house of different types of disabled people and spend time with them. (Pic 3)

**Aim:** To get an understanding of the environment of a disabled person.

**Note:** This activity will help the facilitators to understand basic things about the disabled person and the way they live, the various innovations made to adapt to their environment. Also the various problems faced by them on a daily basis.

**Duration:** Can range from half a day visit to a 24 hours stay.

**Activity 4**

Interview doctors and people from specialised institutions that deal with problems of disabled people. (Pic 4)

**Aim:** To get the opinion of a specialist on the problems of disabled people.

**Note:** This activity helps in getting a broader and more experienced perspective on disability.

**Duration:** 20-30 minutes

**Activity 5**

One month after the people have shifted to their new settlements. A team should visit the houses of disabled people and get their feedback on their new house.

**Aim:** To evaluate the situation for the future and also see if any changes can be made.

**Activity 6**

Following activity is undertaken to understand certain details

**Aim:** To identify the Architectural Obstacles that occur for a disabled person in the Reconstructed House. To understand his perspective and views on the accessibility aspects. (Pic 2 and 5)

**Materials and Requirements:** Transportation to the site, Refreshments for the participants, Paper, Pencil, Camera (for documentation), Video camera, Voice Recorder (optional for documentation), two volunteers, one with basic knowledge of disability and the other to handle the camera.

**Suggested types of people would be:**
An Orthopaedically disabled lady that takes care of her house.
A Visually Impaired person.
An orthopaedically disabled student.
A hearing and speech impaired person
A parent or caretaker of a person with mental retardation.
Old man or woman.
A pregnant woman

**Duration:** 20 - 30 min per interview

Pic 1: Group meeting with the disabled people of a village

Pic 2: Ulaganathan, an Orthopaedically impaired giving his assessment of the reconstructed house.

Pic 3: View of a kitchen space used by an orthopaedically impaired person.

Pic 4: One of the doctors from Certh, India explaining disabilities.
Understanding Disability

Type of participants for this activity
One Visually Impaired Person
One Orthopaedically Impaired Person (who suffers from deformity in both legs) female would be better.
One Orthopaedically Impaired Person (who finds it difficult to walk or is impaired in only one leg)
One elderly person with muscular or joint related problems
One of the family member who assists activities of an Orthopedically Impaired person
Family member who takes care of a person with Mental Retardation

Procedure
• The participant will be brought to the reconstructed site and acquainted with the house by a volunteer. Meanwhile one of the observer is seeing all natural actions and taking notes. The second observer is photo documenting his observations.
• He will then assess each problem under the following categories
  ▪ Will need assistance to reduce trouble.
  ▪ Will not need assistance but is troublesome.
  ▪ Cannot do without assistance
• The participant is asked to create a wish list towards an accessible house.

Highlights
• What are the architectural hindrance the exist in the reconstructed house?
• What are the areas of great concern and immediate action?
• How smoothly is the participant able to manouvere his way around. How comfortable is he with the layout?
• Scope of Improvement and change for better accessibility.

Community Help and Intervention

When a community shifts to an entirely new location they need to re-adapt themselves to their new environment. This process as one can imagine is a fairly complex one, it is done at an individual, family, neighbourhood and community level. In the Tsunami reconstruction process houses have been allotted on a lot basis, meaning that families find themselves with completely new neighbours. The process of re-adaptation gets more difficult for a disabled person for they not only have to re-adapt to a totally new house but also a new village layout and new neighbours.

The following activities are designed keeping this in mind.

Activity 1
Prepare a map of the village giving general layout with important landmarks of the new village.
For visually impaired the same map should be made using thread or other material like clay and sticks so that the entire plan can be understood by feel/touch. (Pic 1 and 2)
Aim: Introduce people to their new environment.
Duration: 2 hours
Number of participants: 10
Using the map the group tries to gain an overall understanding of their new settlement.

Activity 2
Field trip of small groups of disabled people to be taken around the village.
Aim: To get a practical experience of the environment.
Duration: 2 hours
Number of Participants: 10

Activity 3
Field trip of small groups of visually impaired people to be taken around the village.
Aim: To get a practical experience of the environment.
Duration: 2 hours
Number of Participants: 5

1. For the Visually impaired it is important that they learn their way to the important landmarks of the village such that they can define the village layout. They should also be well acquainted with all the hindrances and obstacles on these routes.
2. After the visually impaired shift to their new settlements, few volunteers for the first few days should accompany the visually impaired people to their desired destinations and other destinations that can be of use like the dispensary, school, community centre, grocery shop etc. They should be taken for leisure walks to acquaint them to the different parts of the village. (Fig 1)
Observations of a post Tsunami reconstructed house

The following photographs are part of the documentation of the research conducted. The Observations made of the site of Karaikalmedu, Karaikal - Pondicherry are provided for reference.

Participants who reviewed the reconstructed house.

< Miss Muthu Walli, suffers from orthopaedic disability and has both legs deformed.
• She does not use any assisted device and moves around with the help of her deformed leg with difficulty.
• She is unable to stay in one position for more than 15 min. and cannot walk great distances.
• Her height from the ground level is about 2.2 ft. and can reach out to things up to 3.5 ft.
• Defecating is one of the main problems she faces in her day to day activities.
• She helps her mother with basic household activities and takes care of her three other mentally retarded siblings

< Mr. Raji, suffers from partial visual impairment
• He does not use any assisted device (for example walking cane) and moves around with difficulty.
• Uses his hand to look for things around him and actively moves around the village.
• He is about 6 ft. tall.
• Faces problems with small objects on the road while walking.
• Survives by doing small chores of the village people.

< Mr. Ulagnathan, suffers from orthopaedic disability and has both legs deformed.
• He does not use any assisted device and moves around with the help of her deformed leg and hands with difficulty.
• Unable to stay in one position for more than 15 min. and cannot walk great distances.
• His height from the ground level is about 2.2 ft. but can reach out to a height of 5 ft. by using his legs. However cannot stand for more than 5 mins.
• Defecating is one of the main problems he faces in his day to day activities.
• He is a senior secondary student and uses a tricycle to travel distances.

< Miss Parameswari, suffers from Mental retardation and orthopaedic deformity.
• She is unable to balance or control her body.
• She needs assistance of her mother for basic daily activities like defecating, bathing and eating.
• Her mother finds he bathing room and toilet in the reconstructed house to be small and needs it bigger. She finds the veranda heights of the front yard and backyard dangerous for her daughter.
**Heights, Handrails and Space**

- Total absence of handrails and bars for support. Handrail needed at appropriate height for people with leg deformities.
- Varying heights

**Pic 1** shows the step leading to the entrance door.

**Pic 2** shows the steps leading to the terrace.

- Height of each step varies.
- The step is unusually high making it difficult to climb.
- For Muthu Walli it is impossible to climb the terrace stairs.
- The width of the staircase is also very narrow giving little space to climb
- People with leg deformity will find it either extremely difficult or impossible to climb these staircases.
- People with Visual Impairment may find it difficult to gauge the height the next step.
- Under Low lighting conditions these stairs may be hazardous for almost everyone.

**Pic 3** Ulaganathan on the terrace staircase

**Pic 4** shows the back entrance to the house and the veranda that leads to the toilet.

**Pic 5** shows the small space of the toilet and the door which opens inwards.

- Toilets in the rural setup have water storage containers and other objects... these occupy space.
- If the toilets are small and the doors to these toilets open inward then this creates a problem in closing and opening of the door once inside. (see Pic 6 and 7)
- Sometimes disabled people need assistance in the toilets and some use accessories like stools & chairs to defecate. If the toilet space is not big enough and the door is opening inwards there may be a problem (see Pic 7)

**Pic 6**

**Pic 7**
Pic 15 shows the back veranda.

Pic 10 shows the efforts to open a locked window.

Pic 11 shows the method adopted by Muthu Walli to access switches.

Pic 12 Muthu Walli testing a kitchen tap.

Pic 8 shows the effortless access to the bathing room tap.

Pic 10 shows the effortless access to open the main entrance latch.

Pic 14 shows the front veranda.

Pic 16 shows Raji standing next to a small parapet on the terrace.

Total absence of handrails for support. Handrails needed at appropriate heights for people with leg deformity.

Handrails should be installed wherever possible. They should be installed at various heights for people with leg deformities and other disabilities.

Increase the height of the parapet.

Pic 13 shows Ulaganathan on the steps.

Annex 24

Annex 25
Obstructions and Hindrances

• Obstructions either make the path of movement narrow or lead to accidents during nights or under low lighting conditions.

• Removed if possible
• Levelled to the surface.
• Moved away from the path
• Plantation should not stop or hinder path of movement.
• All the edges should be bevelled

Obstructions and hindrances should be

Pic 17 shows Ulaganathan on the path leading to the back yard of the house.

Pic 18 shows various obstructions on the path leading to the back yard of the house.

Pic 19 shows the backyard of the house pointing out the drain pit that can act as an obstruction when coming out of the toilet. According to Ulaganathan he may trip over it in the night.

Pic 20 and 21 shows Raji climbing and descending the stairs and avoiding the ledge.

Pic 22 shows one of the edges at the entrance of the house.
• Absence of landing at the entrance.
• Extremely high step to climb.

• The provision of a landing at mid-height results in a staircase that is safer and easier to climb.

• A Parapet wall protects a person coming down the staircase and provides a secure landing.

• Absence of light switch can result in accidents during nights or under low lighting conditions.

• All the lights outside the house should have switches close entrance and exit doors at an accessible height.

• Height Adjustments made by the people after shifting into the house.

• Adding of a mini ramp by the residents for their vehicles. Similar additions can be made for the convenience of the disabled people.

• Fencing made out of thatch.
Annex

Technical details for ramp and staircase

Staircase
- The minimum width of the stairs 0.90 m.
- An intermediate handrail installed for stairs wider than 3.00 m.
- Provide an intermediate landing with a length no less than 1.20 m, when the stairs cover a difference in level of more than 2.50 m.
- Landing length at the top and at bottom of the stairs should not be less than 1.20 m. (Fig 1)

Doors
- The minimum width of the door should be 0.90 m
- The minimum clear width of interior doors should be at least 0.80 m.
- For double leaf doors, the width of one of the leaves at least 0.80 m.
- Doors should open effortlessly. They should not be heavy.
- Manual door hardware (handles, locks, pulls, etc.) should be located no higher than 1.20 m (not exceeding 1.40 m)
- Lever-type handles should be easy to operate with a closed fist.
- The threshold should not be more than 20 mm high and should be beveled.

Ramp
The maximum recommended slope of ramps is 1:20. Steeper slopes may be allowed in special cases depending on the length to be covered.

<table>
<thead>
<tr>
<th>Maximum slope</th>
<th>Maximum length</th>
<th>Maximum rise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:20 i.e., 5%</td>
<td>8 m</td>
<td>0.50 m</td>
</tr>
<tr>
<td>1:16 i.e., 6%</td>
<td>5 m</td>
<td>0.35 m</td>
</tr>
<tr>
<td>1:14 i.e., 7%</td>
<td>2 m</td>
<td>0.15 m</td>
</tr>
<tr>
<td>1:12 i.e., 8%</td>
<td>1.25 m</td>
<td>0.12 m</td>
</tr>
<tr>
<td>1:10 i.e., 10%</td>
<td></td>
<td>0.06 m</td>
</tr>
</tbody>
</table>

- There should be a complementary ramped route next to stairs or steps.
- Construct a ramp with slope not greater than 1:20.
- Lengthen ramp to reduce slope.
- There should be a landing of at least 1.20 m length, at 10.00 m intervals, at every change in direction and at the top and bottom of every ramp. (Fig: 3)
- Ramps with a rise of 0.45 m or more should be protected on both sides by adding railings.
- Ramps wider than 3.00 m should be provided with an intermediate handrail.
- Add an intermediate handrail where necessary.
- Minimum width of the ramp should be at least 0.90 m (Fig: 2)
- Ramp surface should be clear of obstructions.

Fig 1: Shows even steps and appropriate landings at regular intervals.

Fig 2:

Fig 3:
1. United Nations - Enable
   Accessibility for the Disabled
   A Design Manual for a Barrier Free Environment

2. Government of India
   Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly Persons
   web link: http://www.disabilityindia.org/Guidelines%20&%20space%20standards%20for%20barrier.html#Introduction

3. Accessible Design/Universal Design Resources
   http://www.makoa.org/accessable-design.htm

4. BasicNeeds
   Works in the developing world to end the suffering of mentally ill people.
   India Contact - naidu@basicneedsindia.org
   web link: http://www.basicneeds.org/india/index.asp

5. Vidyasagar
   The organization works with children and young adults with cerebral palsy and other neurological disabilities, their families and the communities they live in.
   # 1, Ranjith Road
   Kotturpuram
   Chennai - 600 085
   Tel.: +91 44 2235 4784 / 85 / 22354980
   Tel/Fax: +91 44 2235 3757
   Adult Unit: +91 44 2434 2604
   Email: response@vidyasagar.co.in
   http://www.vidyasagar.co.in/cbr.asp

6. ABILITY FOUNDATION
   Working for the empowerment, integration and rights of persons with disabilities.
   27, Fourth Main Road
   Gandhi Nagar, Adyar
   Chennai 600 020, India
   Tel: 91 44 24452400
   Fax: 91 44 24413013
   Email: abilityindia@vsnl.net
   www.abilityfoundation.org

7. CERTH-INDIA
   Have a school for mentally retarded and work on health related issues of the disabled.
   CERTH-INDIA
   181, Gingee Salai,
   Dubrayapet,
   Pondicherry - 605 001
   India
   Tel : 0091.413.2224986
   Telex : 0091.413.2337564

8. RASA (Ramana Sunritya Aalaya)
   Is the only non-profit organisation in the city that applies the methodology of Creative Movement Education to children with physical and mental disabilities
   RASA,
   #25, Prithvi Avenue,
   Abhirampuram,
   Chennai 600 018.
   Phone: 499 7607.

9. AASHA
   Aasha an alliance for the mentally ill was founded by Dr. Sarada Menon in 1989. The first of its kind in the country, to serve the cause of Schizophrenics and their families, Aasha is an associate member of the World Schizophrenia Fellowship,
   Pankaj Nivas, 25,
   Third Street, State Bank Colony,
   Nanganallur,
   Chennai  600 061.
   Phone: 2232 2643
ARCHITECTURE & DEVELOPMENT (A&D) India, is the counterpart of Architecture & Developpement, an NGO founded in 1997 in Paris. A&D was registered as a Trust in India based in Visakhapatnam, Andhra Pradesh in South India.

A&D works in partnership with many NGOs interested in issues related to Sustainable Habitats in various parts of the world. Involved in activities ranging from reconstruction programs in tsunami affected areas, networking among NGOs, professionals and academia, information dissemination, initiating and implementing exchange programs for professionals and development activists etc. A&D’s main objective is to reinforce the competences of professionals so that it will support in affirming their role and responsibility as citizens in society and a pooling of resources, competences and expertise in various fields.