



Cluster Guidelines Structural Repairs and Reconstruction

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Glossary and Key terms used in the Guidelines

Category III- Repairs involving complete roof and carpentry, ceiling after one or several walls and upper ring beam damaged, door/windows, floor, partial or total looting; and secondary destruction is caused by fire breaking out in the interior of buildings as a result of shelling

Category IV- Full wall or load bearing structure completely damaged. Only the foundation is remaining

Closed Design- Turnkey projects that are typically targeting vulnerable individuals

Construction- Could occur in a new plot (relocation) or on the same plot without the requirement of fitting it onto the previous or current foundation according to the region.

Durable shelter solutions for permanent stay- Conducting repairs to households while looking at the holistic needs of crisis affected populations at the interior and exterior levels of the house while mainstreaming livelihood and protection approaches

Multiple layers of intervention- Providing top up repairs to same objects in order to implement category III and IV repairs to households that were not fully repaired during the initial crisis response stages in 2014-2015

Open Design- Projects implemented for able bodied and young families which enable them to make additional modifications to the household structure at a later stage.

Reconstruction- Linked to the pre-existence of a reusable foundation to build up a new wall on this pre-existing foundation. As a result, the main dimension will be preserved to maintain its consistency in lowering loads onto the building's former foundations.

Structural repairs- Retrofitting the damaged structures of the building to firstly ensure the structural integrity of the building and secondly to provide minimum adequate space for a permanent stay

Purpose of Guidelines and Introduction to durable shelter solutions

The humanitarian crisis in Ukraine has resulted in significant destruction to houses found along the contact line and a lack of adequate housing for those displaced by the humanitarian crisis. The scale of damages on homes varies considerably, with some homes requiring light and medium repairs (roof, doors, or window), and others requiring significant structural repairs and complete foundational reconstruction. In a protracted conflict situation, various modalities of implementation need to be explored to meet housing needs while looking towards durable shelter solutions for permanent stay. The context of Ukraine creates four points of entry for the provision of such shelter solutions:

1. Structural repairs of damaged houses
2. Reconstruction of non-repairable houses
3. New construction (reintegration of IDPs who either fear a return home or are unable to return home)
4. Repair of houses in poor conditions, which can be supported as affordable accommodation to IDPs who don't want to return home.

These guidelines serve to **promote good practices in providing durable shelter solutions for permanent stay** by **exploring existing practices in Ukraine and other relevant building practices** in order to **provide Shelter Cluster partners with relevant guidance** and best practices for **structural repairs (CAT III)** and **reconstruction (CAT IV)**. The guidelines do not aim to promote one practice over another, but rather to provide a comprehensive overview of best practices in CAT III and CAT IV implementation and program design.

The recommendations offer **not only a technical perspective but also an operational perspective** in the area of selection of appropriate methodology for construction in addition to engagement of beneficiaries, conditions for housing, land, and property, and risk management for quality control of such projects. In the context of Ukraine, the provision of ready-to-be-used and adequate **homes and apartments** is an urgent priority for the most crisis impacted individuals and families. The Shelter Cluster's guidelines on structural repairs and reconstruction facilitate the selection of **the most appropriate methodologies, construction details and level of finishing, financing, and scale** for interventions, while providing tips for consideration given scale of destruction and context of intervention. Therefore, those using these guidelines can take a **targeted approach according to the type of beneficiaries and family sizes** by having a reliable reference guide on best practices, cost effectiveness, and how to overcome common challenges while designing and planning heavy and structural repairs interventions. For example, for the **most vulnerable individuals and families, turnkey projects** are recommended, so that they are able to move into already constructed and finished housing. While drafted primarily for use in Government Controlled Areas of Ukraine, the guidelines can be adapted for broader and general applications in Non-Government Controlled Areas when light and medium repairs become feasible.

Durable solutions

Given the **protracted conflict situation in Ukraine**, a **renewed focus on durable shelter solutions** is required to implement structural repairs and reconstruction work activities to finalise repairs to crisis-damaged households. Durable shelter solutions encompass protection and livelihood approaches, ensuring construction and repairs to a building while addressing the secondary needs of those whose lives have been interrupted by conflict.

More than just a building, the reconstruction of part of or an entire dwelling represents a significant step in terms of assisting crisis-affected individuals overcome trauma and stress linked to a conflict. Perceived with a protection role, durable shelter solutions for permanent stay aim to guarantee beneficiaries access to **enduring, reliable, and adequate** shelter.

Minimum adequate standards can enable individuals to focus on other areas of rebuilding their lives. Furthermore, durable shelter solutions promote the involvement of the community and accelerates the process of recovery through either engaging the community in direct repair works or as being witnesses of seeing households in their community restored as an indication that life is returning to normal.

Criteria of durable shelter solutions in Ukrainian context 2014-16- crisis

- **Ensures resiliency of household-** In ensuring durable solutions for crisis-impacted populations in Ukraine, **roof construction should be prioritized** (absence of roof results in quicker destruction time). Following the fulfilment of this primary condition, **the building should then be retrofitted to the structure to ensure appropriate safety of households according to Ukrainian building standards and practices.**
- **One core room-** One room of living area should be properly enclosed and covered. This room should provide appropriate space according to the permanent family composition¹.
- **Insulation/Heating-** Proper basic insulation in living areas is needed in order to maintain liveable temperature with minimum energy expenditure through at least one reliable heating source. As the annual average temperature in Ukraine is recorded as 9° Celsius, heating for living spaces and water sources becomes a main criterion to ensure humanitarian conditions within the home.
- **Water and Sanitation-** Proper access to basic water and sanitation preserves dignity and preserves hygiene and health. Similarly, at least one bath room and one toilet should be available depending on the number of people residing in the household.
- **Circulation areas-** Beyond the core elements that compose a household, proper facilities for adequate and permanent stay including minimum basic kitchen area and sink equipment should be available to enable families to prepare meals and clean their living space. Space for movement of persons including hallways, appropriate electrical outlets, landings, openings, and stairs should also be considered. In the case of elderly families and persons with limited mobility, wheelchair storage and through the floor lift provision should be included when

¹ More than 2 people per room (sleeping + living room to be considered) could be considered over-occupancy (1 room = 1 to 2 persons, 2 rooms= 3 to 4 persons, 3 rooms= 5 to 6 persons)

appropriate. Electrical outlets should be installed in a way that people can access them from a lower position if disabled or injured.

- **Minimum storage space-** Space within the household should enable families to not only sleep, reside, cook, and access water and sanitation but should also enable families and individuals to store their possessions in a way that does not compromise their living space.
- **Improving housing quality for energy efficiency-** Housing repairs that explore ways to integrate energy efficiency in design will reduce cost inefficient fuel consumption, providing solutions to financial and heating concerns for families who are residing within these homes.
- **Minimal conditions for recovery-** Durable shelter solutions should link with other sectoral interventions to ensure that households are located in areas where the minimal conditions for recovery are in place including food, appropriate clothing, essential medical services, livelihood sources, and education.

While the guidelines are primarily focused on how to design shelter heavy and structural repairs programming, implementation modalities should explore ways of synergizing shelter response with other sectors of response to ensure that the conditions for “permanent stay” are in place. Through Shelter partners’ experience in Ukraine, the building of a house alone is not enough to guarantee adequate standards if the requisite services are not in place for maintaining one’s health, education, and livelihoods.

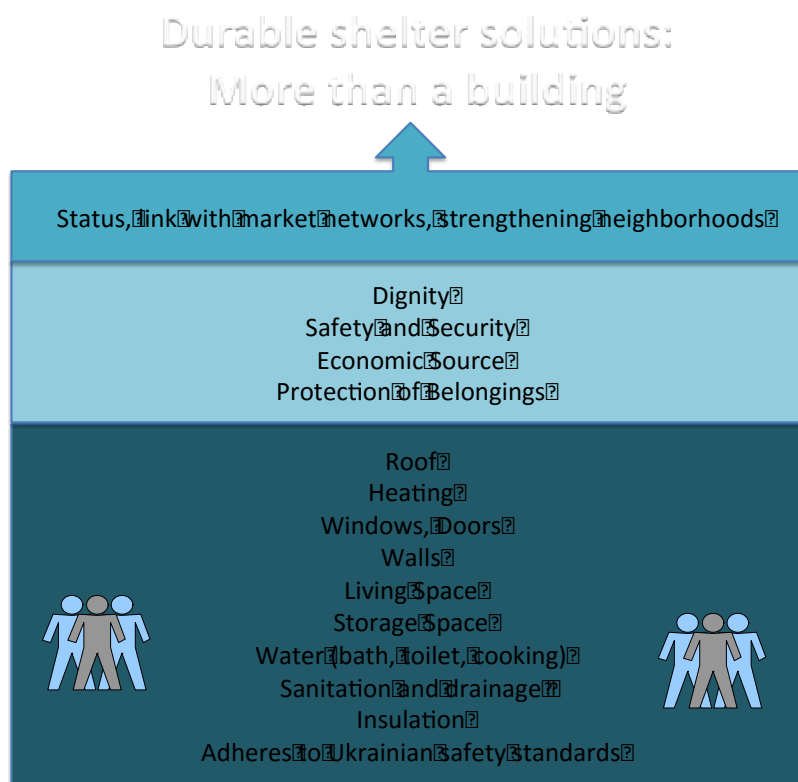


Figure 2- Adapted from Global Shelter Cluster More than just a roof

Strategic aims, differences with Light & Medium repairs

Category of damage, Logic of intervention

CAT 0	CAT I	CAT II	CAT III	CAT IV
No damaged	Light damaged	Medium damaged	Structural damaged	Totally destroyed
<i>example</i>	<i>30-40 m² of roof</i>	<i>Complete roof 90-110 m² partial carpentry</i>	<i>Complete roof, complete carpentry, ceiling, one or several wall damaged, upper ring beam damaged, door/windows, floor, partial or total looting; destruction caused by fire breaking out in the interior of buildings as a result of shelling</i>	<i>All wall or load bearing structure down. Only foundation remaining</i>
<i>Intervention</i>	Acute Emergency (plastic sheeting) to prevent further decay Stackable on recurrent based if necessary			<i>Not applicable</i>
	Transitional, stackable Light Repair	Transitional, Stackable Medium Repair		
			Durable, stackable Structural repair	Durable, Final non-stackable Reconstruction

Figure 3- General summary of intervention types

Light & medium repairs completed still leave adequate housing gaps

In 2014, the Ukraine shelter sector strategy was developed during an emergency phase with an emphasis on rapid response provision of housing. As a consequence, the one warm room policy focused on 2 main items for repair: glazing and roof patching. Guided by the premise that houses are an important asset in the economic well-being of those who are residing in its interior, houses **required in the first instance protection from conditions that could further decay the structure**. This required acute emergency interventions, aiming to **prevent roof deterioration caused by elements such as rain and snow** through roof repairs and other vulnerable elements of the house to insulate it from the cold.

Shelter partners implementing such repairs quickly identified that the **scale of damage varies considerably from house to house but also building to building (apartments)** (some households required only window repairs, others roof, others both items, while other households were completely burned to the ground). Therefore 2015 activities sought to address the multi-configured scale of damages. Despite a significant volume of works realized, these interventions were not enough to systematically address the full scope of damage done to households.

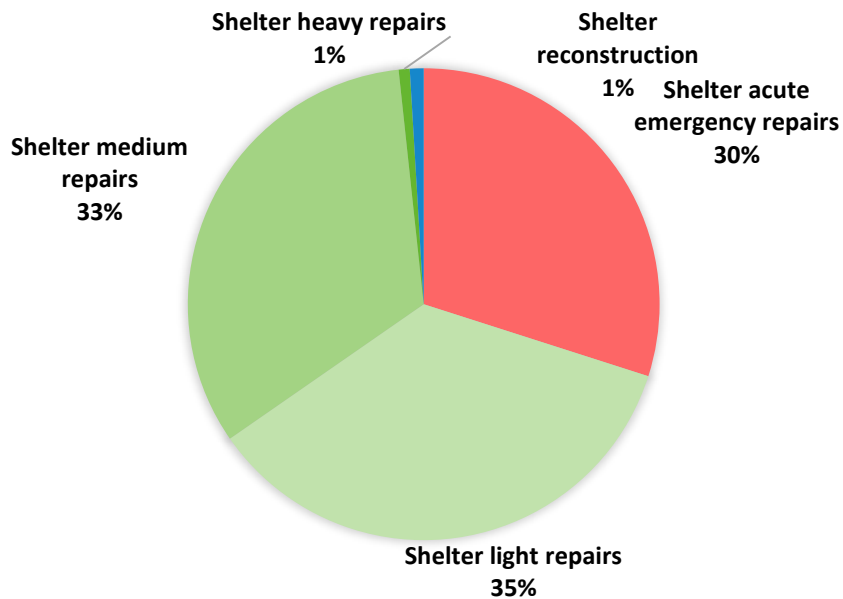


Figure 4- Percentage of repairs response from Ukraine Shelter Cluster 5W Jan 2016

At the outset of the crisis, light and medium repairs were deliberately classified as permanent or durable solutions while technically they were only transitional solutions, repairing only partial elements of fully damaged houses. Such transitional repairs enabled families to live within these enclosed areas of their homes, despite other damages made to the entire structure. Such classifications were two-fold: limited risk liability and site work responsibility in addition to challenges with access to some sites because of a lack of demining. While such activities limited risk liability and site work responsibility, 2014-2015 shelter program approaches did not fully provide for **sustainable and durable housing**, especially in light of a protracted conflict scenario, **where inadequate housing is exacerbating humanitarian needs** and challenges as families have spent 2 winters in homes which are partially destroyed or have foundational inadequacies. Moreover, local authorities have reported a lack of resources and budget to address the issue of structural and foundational repairs, especially as 93% of those damaged during the crisis are privately owned.

Multiple layers of intervention/repairs on same object

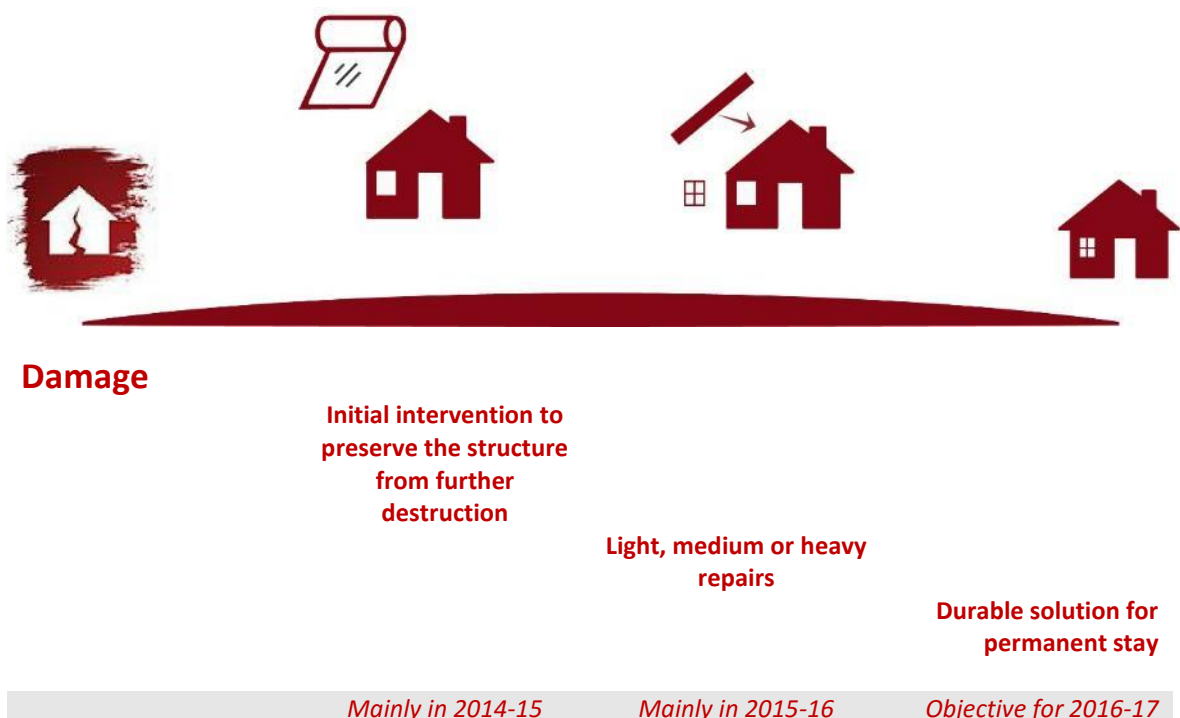
The Shelter Cluster of Ukraine is encouraging **multiple layers of intervention as an opportunity to create** the conditions for durable housing as a number of homes sustaining structural damage and complete destruction still require interventions in order to meet the criteria of durable shelter solutions as elaborated on pages 8-9.

Shelter interventions in durable solutions require works to be **complementary** in order to fulfil basic standards and rules related to living conditions such as:

- Living area
- Protection from elements
- Basic facilities and amenities (kitchen, bathroom, etc.)
- Circular areas
- Adequate insulation during the summer months and tolerable for summer heat
- Prevention of further degradation of the structure

Shelter partners in 2016 are encouraged to make a **paradigm shift** from this repetition of short-term impact activities and programs (such as roofs and windows) to find ways that their programs can result in **durable and sustainable housing for crisis-impacted populations by complementing interventions that result in joint-completion of households to satisfy the aforementioned conditions**. Best practices were already established by several Ukrainian NGO partners who pooled their resources to provide minimum adequate living condition in household premises. The use of the Ukraine Shelter Cluster's Damage Database per address could be one tool to inform partners on households that require additional interventions in order to meet criteria of durable shelter solutions.

For heavy repairs, interventions can be assumed to be building up to **durable shelter solutions for permanent stay** as is illustrated in the infographic below:



Shelter activities in 2016 could include the following (but certainly not limited to) the following multiple layers of intervention:

- Completing an initial but limited light repair done in a previous year with a heavy repair intervention to achieve a durable solution. Winterization insulation activities (stove and insulation materials) could be provided if necessary.
- Pairing light repairs glazing program with a medium repair roofing program and winterization insulation activities (stove, insulation materials for a warm room)
- Other combination of works that aim to build on earlier light and medium repair works with foundational works.

Method of calculation for determining concerned area

General housing conditions in Ukraine

Challenges related with heavy repairs and reconstruction stem from the pre-crisis housing situation in Ukraine.

Despite clear Ukrainian building code guidance that housing should respect 21m² per capita, the **pre-crisis situation in Ukraine was far below this standard** with the average of citizens living with less than 13.65 m² per capita, with the poorest quantile residing in conditions that correspond with less than 7.5 m² on average.²

Furthermore, in a report cosigned by the Government of Ukraine's Ministry of Regional Development, Construction, Housing and Communal Services in 2010 1.39 million Ukrainians³ were on a waiting list of those who needed improvement to their housing due to their general housing conditions and socio-economic status. The criteria for this waiting list was the following, providing an official indication of what constitutes as poor and inadequate housing in Ukraine:

- Housing space below the established norm
- Substandard and unsafe housing
- Overcrowded housing (two or more families sharing accommodation)
- Residing in hostels, hotels, or non-official temporary housing arrangements
- Possessing sublease contracts in state and municipal housing
- Renting private accommodation for more than 5 years
- Those suffering from severe forms of chronic disease⁴

² UNECE Ukraine Country Profiles on Housing Land Management

³ Of which 68% of those had been on this list for nearly 10 years.

⁴ UNECE Ukraine Country Profiles on Housing Land Management

Ratio gross/ living usable floor area

According to the type of building, techniques and the design ratio between the living usable floor area⁵ and the gross floor area⁶ there is significant variation, as illustrated in the chart below.

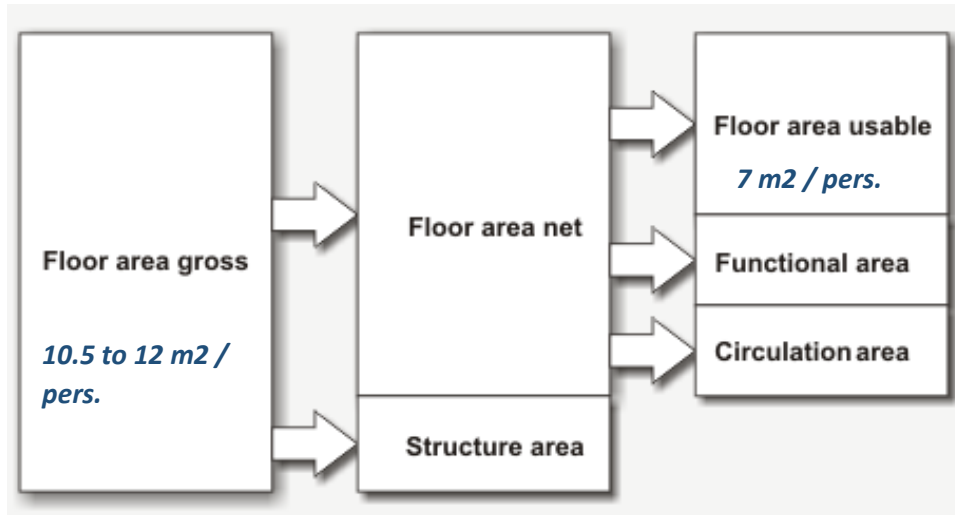


Figure 5- Indicative of spacing logic not in complete conformity with Ukrainian standards

This lack of adequate space and the reference point of 7.5m2 as the threshold worst condition for the lower end spectrum of the socioeconomic scale could inform humanitarian interventions to be aligned with minimum standards for durable solutions.

Standards in Ukraine, recognized practices, guidelines

The Ukraine State Committee of Construction and Architecture's Standard Provisions on Residential buildings recommends the following dimensions⁷:

- Living room area in a **single** room apartment should be no less than 15m2, while apartments with more than one room should be no less than 17m2
- The minimum sleeping area for one person is 10m2 and for 2 people, 10m2
- The minimum kitchen area in a single bedroom apartment is 7m2, and for a 2-bedroom apartment should be more than 8m2
- The minimum working area of a room or an office is 10m2

Additional details are provided in **Annex I**.

Technical spaces

The minimum standards for technical space are defined in detail in **Annex I**.

⁵ Usual concept of the net usable area as sum of all room area higher than 1.8m, including bedroom, living room, kitchen, corridor and bathroom excluding wall thickness, staircases or any technical duct (piping/tubing)

⁶ The total floor built floor area within the perimeters of outside wall.

⁷ ЖИТЛОВІ БУДИНКИ. ОСНОВНІ ПОЛОЖЕННЯ ДБН В.2.2-15-2005

Summary of living space

	1-2 pers.	3 pers.	4 pers.	5 pers.	6 pers.	7 pers.
STRUCTURAL REPAIRS minimum total covered or gross area	House average 60 to 80 m ²	House average 60 to 80 m ²	House average 60 to 80 m ²	House average 60 to 80 m ²	House average 60 to 80 m ²	House average 60 to 80 m ²
STRUCTURAL REPAIRS minimum space enclosed net livable	14 m ²	21 m ²	28 m ²	35 m ²	42 m ²	49 m ²
CORE HOUSE total minimum covered or gross area	24 m ²	36 m ²	48 m ²	60 m ²	72 m ²	84 m ²
CORE HOUSE minimum space enclosed net livable	14 m ²	21 m ²	28 m ²	35 m ²	42 m ²	49 m ²

Items to consider when designing structural repair interventions

Two Methodologies

When designing a program focusing on structural repairs, two forms of structural repairs can be implemented depending on the type of beneficiaries and the type of work being implemented. **Closed design** interventions are done for vulnerable and immobile beneficiaries as turnkey projects, while **open design** projects can be linked with early recovery interventions, enabling active involvement of beneficiaries:

Closed Design	Open Design
• Full construction on our outside existing foundation • Expensive turnkey project to support extremely vulnerable families (limited mobility, elderly, protection cases) • Long-term perspective safeguard for families who may not be able to make adjustments at a later stage	• Structural repairs • Larger scope of intervention (requires work on a larger foundation) • Enables families to carry out further repairs after initial humanitarian intervention • Linkages to early recovery

The following **technical and socio-economic selection criteria** should be taken into consideration when performing needs assessments to inform such project interventions:

Structural repairs with open design

- Living in premises, proven return or confirmed intention of return.
- Able body family with willingness to rebuild or repair their own plot demonstrating potential for active participation and involvement (example of kind of beneficiaries: young able-bodied family who will need extra space when more children are born)
- Not owning another permanent shelter solution somewhere else.
- Land owner of the previous plot
- Wall and load bearing structure partially reusable.
- Interventions should focus on preserving the core house function

Reconstruction with closed design

- Living in premises, proven return or confirmed intention of return
- Beneficiary is vulnerable and requires extra accommodation or protection due to circumstances of conflict or socio-economic situation (example of beneficiary: *babushka* who could not move from her village)

- Not having another permanent shelter solution somewhere else.
- Landownership to be clear; this type of project is possible for beneficiaries not owning land (relocation and resettlement cases)
- Closed concept
- Turnkey project with no involvement of beneficiaries
- Limited feasibility if the cost is greater than buying a new house or apartment

Additional information on housing, land, and property issues (**Annex V**) and vulnerability profiles (**Annex VI**) are found in the annexes below.

Overview of typical buildings in Donbas

With mainly an urban and industrial background related to mining, Donbass has 3 main housing categories detailed at length below, with each type corresponding to Ukraine's development and regional context:

Individual house

Built mainly in rural districts, and also in the surrounding towns and suburbs of major cities, such as Donetsk, Mariupol, and Luhansk, individual houses are characterized by plot construction, which can also accommodate gardening and sometimes small greenhouses.

The oldest houses were built using wattle and daub techniques also called locally *Мазанка*. This cheap form of construction is often associated with poverty and unhealthy living conditions.

Similar houses were built using timber material with planks or log techniques.

Lately in the mid-20th century, individual homes increasingly used burnt bricks combined with standard brick bonds, maintaining the general house's structure and form while exchanging the loadbearing principle from a structure to a plain wall. In more recent constructions, homes have used concrete blocks.

In terms of destruction, individual houses were exposed to a range of damages, from small shrapnel punctures in the roof cladding and destroyed window pains to more serious damages linked to direct shelling destroying the complete roof, ceiling and sometimes the wall structure and in most severe cases, destroying the full foundation.

Consequently, individual households could benefit from both heavy repairs and reconstruction to the foundation.



Figure 6 Traditional Ukrainian individual house with typical veranda extension



Figure 7 Small calibre direct hit, repairable with adequate techniques

Multistoried Brick Building

Found across Ukraine and made from a masonry of burnt brick, constructions on multistoried brick buildings were mainly realized before the boom of Reinforced Cast Concrete (RCC) construction (described in the following section). They are at minimum 2 stories and can be up to 5 stories in more urban environments.

These buildings usually have a hipped roof made initially from asbestos corrugated cement sheet and can accommodate several families.

Indirect shelling on these houses have resulted in blown out windows, multiple roof punctures with additional difficulty for repairs, which are exacerbated from lack of roof maintenance in the cladding itself and the under laying carpentry. In case of direct shelling, damage can be caused both by the direct hit of the mortar fire and any secondary consequences, such as fire.

If a fire were to break out in these multistoried brick buildings, the floors, walls, and load bearing structure could survive but will require a compulsory detailed engineering assessment prior to any interventions due to the fact that the structural integrity of the building may have sustained damage, which may not readily be apparent on initial observation.



Figure 8 Results of fire damage to brick building.



Figure 9 A large calibre strike brought down several floors, even if the structural integrity of the building was seriously affected, both sides are still useable.

Reinforced Cast Concrete Building

After World War II, the boom of reinforced casted concrete linked to massive industrialization produced large living units accommodating dozens of families under the same roof.

Using modular prefabrication or direct casting on site, reinforced concrete usually provides main load bearing structures with a principal wall and geometric facades filled with various materials including concrete block, brick or other materials.

This type of building is usually 10 floors in height and has the highest structural resilience to shelling. While according to Ukrainian standards (DBN B.1.1.7–2002), the buildings are labeled as II (out of 5) category of fire resistance, which is a relatively good rating, secondary impact of mortar fire have resulted in damage to these buildings.

Fires within the building due to overheating temperatures could produce exceptional dilation of the buildings' iron reinforcements inside the concrete, which could result in serious structural damages.



Figure 10 Fire in a multistoried building, donetsk 2015



Figure 11 Inside an apartment after shelling, People in Need assessment, 2015. Credit R Lunin

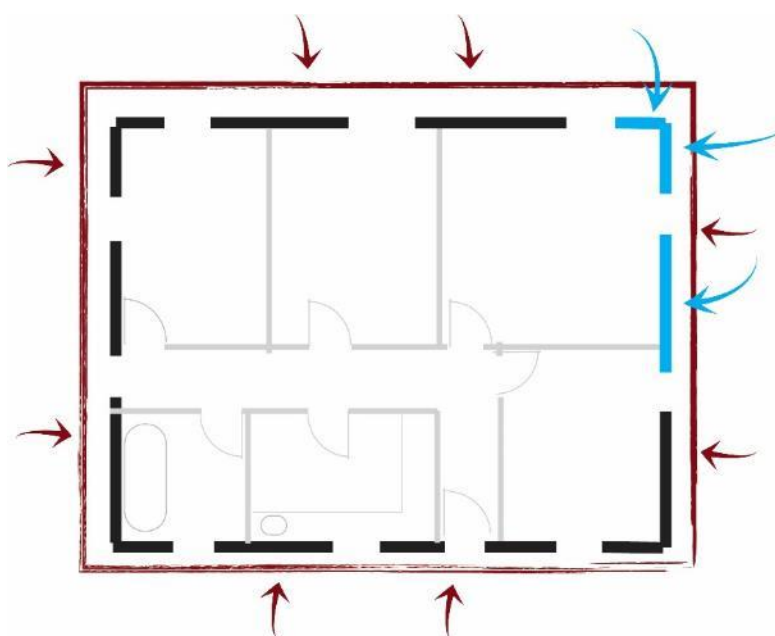
Elements of construction, reconstruction, and repair

Specificities of structural repairs

Structural repairs also called heavy repairs are **defined** as retrofitting the damaged structures of the building to firstly ensure the structural integrity of the building and secondly to provide minimum adequate space for a permanent stay. The principle is to **restore the initial cover** (roof) to protect the wall structure from further degradation, then to enclose part or the complete space according to the number of persons residing in the home into a fully livable space.

Description of a typical case for repair

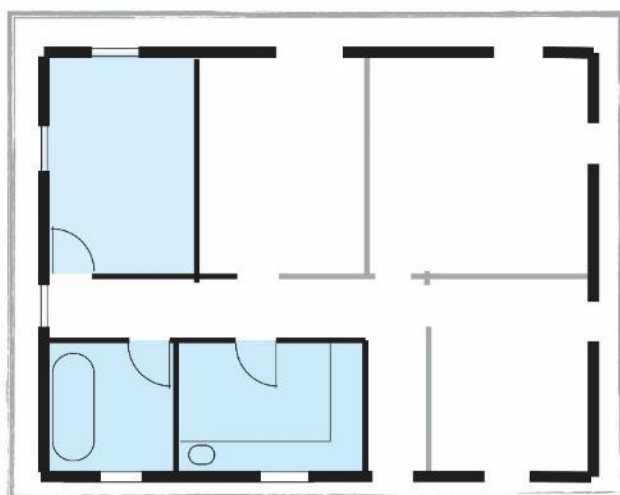
Typical one floor individual house: 60 to 80 m².



Step one: Ensuring the **structural integrity** of the dwelling.

Red line: Perimeters of the roof should be fully rehabilitated without ceiling and insulation

Blue line: Partial wall retrofitting, masonry reconstruction or similar, upper frame bond through a ring beam or identically functioning item.



Step two: Providing adequate living space for **permanent stay**.

Blue area: Surface is the primary concern with interventions on the floor, opening (windows and doors), ceiling, insulation, electricity, water and sanitation

The remaining area will be subject to future repair by beneficiaries themselves according to their socio-economic position and the recovery process best suited to their situation.

Prefabrication, and linkage to livelihood

As a cost saving measure, prefabrication of housing elements or full construction of the house in a workshop could create added value for livelihoods, speeding up the time for construction and minimizing the risk of weather delay.

For the livelihood aspect, the shelter program could be paired with setting up a workshop through micro credits. The main advantages are:

Shelter point of view	Livelihood point of view
Priority in production delivery	Secure a big clientele during the first year
Possibility to provide mass purchased VAT free materials, paying only for labor	Possibility to sell excess production to the regular market
Freedom in dimensions and quality	



Suggested items/production:

- PVC window production
- Carpentry prefabricated trusses
- Cement block and product
- Sandwich panels
- Complete house



Figure 13 example of prefabrication, 45 sqr meter, 10,000 USD. The unit is transported as a full house and set up with a crane Dobraya Vest 2016



Figure 12 Pre fabrication of panels. Dobraya Vest 2016



Specificities for construction/reconstruction

Reconstruction is linked to the pre-existence of a **reusable foundation** to build up a new wall on this pre-existing foundation. As a result, the main dimension will be preserved to maintain its consistency in lowering loads onto the building's former foundations.

Construction, on the other hand, could occur in a new plot (**relocation**) or on the same plot without the requirement of fitting it onto the previous or current foundation according to the region.

In both cases, setting up the foundation will be necessary and might require machinery to dig down to a depth of 1.2 meters.

Case examples for reconstruction and construction

Reconstruction: In 2015 near the city of Seminovka, cluster partners began a pilot reconstruction project, using the partially existing foundation. In many of the houses that were rebuilt using this intervention, only part of the original floor plan was rebuilt, taking account of the pipes and sewage systems from the previous outlets.

Construction: In 2015, there were several cases of families who were residing on land without security of tenure. Several municipalities began to allocate empty plots to these land insecure families for relocation and thus new construction activities.

Special items to consider when working on multistoried buildings

Multistoried buildings may also become the target of humanitarian interventions, especially in buildings when one or several apartments were privatized in a communal building. In this case, these privatized apartments are not eligible for state-funded rehabilitation, meaning that humanitarian partners could intervene to provide a gap which Ukrainian authorities are not addressing.

If humanitarian partners undertaking such interventions observe that structural interventions are required, the scope of work and relevant technical documentation should be agreed in partnership with The Department of Communal Constructions, otherwise known by its Russian abbreviation UKS (Управление коммунального строительства УКС). The contact information for the relevant departments in Donbass are provided in **Annex V**.

Technical consideration, minimum standards and indicative cost

The review construction elements after construction elements will summarize main information including reference to **GOST standards**

In italic the reference of the GOST in Russian

Structural repair

Estimated cost for a repairs related to a house for 3 beneficiaries, 30-36 square meters, 15-21 square meters livable

Construction/Reconstruction

Estimated cost if applicable: for a small cottage for 2 persons 24 square meters

Foundation, wall basement

State Construction Norms of Ukraine: Buildings and constructions structures. Composite steel and concrete structures. General rules. B.2.1-10-2009

(UKR: ДБН В.2.1-10-2009 Бетонні та залізобетонні конструкції. Основні положення)

As the lower part of the building, the foundation and wall basement play a critical role in the structural integrity of the building. In addition to destruction sustained during the humanitarian crisis, the main threats to the buildings are frost level and black cotton soil⁸ which could trigger unwanted movement of the entire building. The frost level at 1.2 meters could be considered in many cases as a conservative figure but should be calculated on an individual basis.



Structural repair

Estimated cost if applicable: 0 to 180 USD -for 3 persons-

Usually damages to the wall basement need a careful inspection to check if the load transfer from the upper part of the wall to the foundation is properly done. Cracks or visible damage to the wall basement will usually require digging of a pier hole in order to check the underground part of the foundation. This will determine whether retrofitting will require metal fretting, casting a lower reinforced concrete ring beam or similar interventions.

In case the foundation has been damaged in multistoried buildings, it is strongly advised to avoid any intervention without a complete investigation, report and recommendation from regional building inspection UKS (contact information provided below in **Annex V**).



Figure 14 Digging pier hole checking

⁸ Clay soil made from montmorillonite which dilates according to wet and dry conditions; and can cause a structural shift in the building's foundation

Reconstruction

Estimated cost if applicable: 445 USD – cottage 2 persons-

In contrast to structural repairs, interventions to the foundation during reconstruction or new construction are much simpler. If the visible part of the wall has a serious crack, best practices require casting a small lower ring beam on the building perimeter in order to properly share the load of the walls which will be built on the upper levels.

In case of new construction on expanding soil (such as black cotton soil), two variants are usually considered for a simple one floor building: a reinforced floating slab made from concrete or foundation using short concrete piles regularly spread under a lower beam.

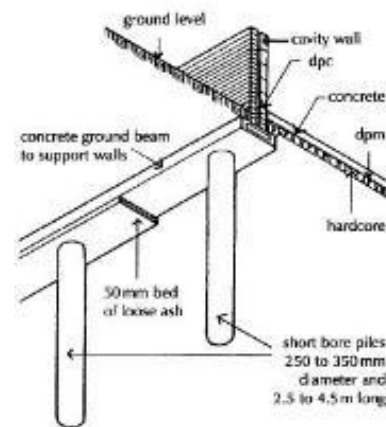


Figure 15 Short Bore Pile, please note that each pile is interconnected with a ring beam



Figure 16 Reuse of the existing foundation for reconstruction. Please note that the foundation walls are excellent and don't need lower ring beam casting. Floor is not installed. (ADRA project Slovyansk 2015).



Figure 18 Lower ring beam made from casted concrete with light reinforcement. The principle is to guarantee an adequate sharing of the wall's load.

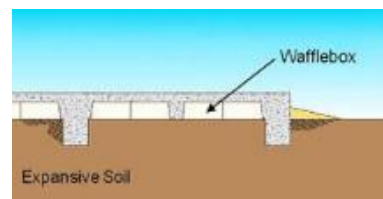


Figure 17 Floating Reinforced Concrete Slab principle, for new construction

Floor

State Construction Norms of Ukraine: Public buildings and construction works. General rules. B.2.2-9-2009

(UKR: ДБН В.2.2-9-2009 Громадські будинки та споруди. Основні положення)

The usable surface of building floors can be made from materials such as compacted soil and lime, which is also true of concrete or wood which has various forms of finishing. Such interventions on floor surfaces are aimed at ensuring a minimum level of insulation, controlling dampening conditions, and providing minimum conditions for proper hygiene.

Structural repair

Estimated cost if applicable: 0 to 55 USD

Interventions on floor surface for structural repairs could mainly focus on resurfacing the existing floor and maybe providing another layer of material covering such as linoleum, tiling repairs or plank repairs in the case of a wooden floor. In certain cases, a damp proof membrane should be installed especially if damp conditions are observed.

Reconstruction

Estimated cost if applicable: 90 USD

If interventions are made on existing reusable floor, the case will be similar to that of structural repairs. In case of new construction, damp proofing, insulation and surfacing should be considered using low cost materials



Figure 19 Damp proof membrane



Figure 20 Some houses have floors which are fully reusable especially those made from non-flammable material as ceramic floor tiles. (ADRA project Slovyansk 2015).

Opening, doors & windows

State Construction Norms of Ukraine: Thermal isolation of buildings. B.2.6-31-2006

(UKR: ДБН В.2.6-31-2006 Теплова ізоляція будівель)

State Construction Norms of Ukraine: Natural and artificial light. B.2.5-28-2006

(UKR: ДБН В.2.5-28-2006 Природне і штучне освітлення)

Openings usually include windows, bow windows, doors, and vents in walls. These elements are critical for good insulation and could be a costly component of the work.

In all cases, windows should be a double glazing of a minimum of 4 mm thick, with the possibility of using a variety of materials (timber, metal, PVC, etc.) for the frame. Doors are usually simple and solid single leaf and recommended despite specified requirements in case of disability. Iron monger such as locks, hinges, and handles could be solid stainless steel or if affordable brass. The main entrance or sleeping place should receive a proper lock.

Structural repair

Estimated Cost: up to 530 USD

In case of reusing previous windows and frame, repairs will concern not only the glazing but also the fixed frame avoiding any potential gaps which would enable air to leak into the structure. Insulation foam could help to fix these gaps. Frame and leaf, cleaning, sanding and re painting has to be considered before reinstallation.

Only the area to be rehabilitated will be equipped with a new opening, and the remaining rooms will be equipped according to beneficiaries' willingness and future means and intentions for using the space.

Reconstruction

Estimated cost if applicable: 530 USD

In reconstruction cases, such openings were totally damaged and probably will have to be fully replaced. For windows, PVC double glazing 4 mm thickness is a recommended choice.



Figure 21 Replacement of windows, Sloviansk, People in Need 2015, credit R. Lunin



Figure 22 Windows, please note the insulation foam along the frame and the windows sill overhang in order to protect the wall. (Luxembourg Red Cross, Slovyansk 2015)

Wall

State Construction Norms of Ukraine: Brick and stone construction armo. Terms. B.2.6-162-2010

(UKR: ДБН В.2.6-162-2010 Кам'яні та армокам'яні конструкції. Основні положення)

A plain load bearing wall or infilling⁹ inside a structure, enclosing space with walls could use many different techniques and materials.

Annex II to these documents is providing several variants in term of technology according to the Ukrainian context. The choice of the appropriate construction techniques has to be done in regards to the value for money, supply chain, capacities, and participation of beneficiaries in the site work.

Structural repair

Estimated Cost: up to USD 360

Repairing walls serves two functions: restoring the enclosing function and restoring the lowering load function related to the structural integrity of the building.

Masonry

In case of masonry of burnt brick or concrete blocks, these two functions are directly related. Usually the intervention is aimed at dismantling the block to a layer to be considered as safe when rebuilding, whether or not steel reinforcements are used. If walls were significantly leaning prior to sustaining damage, dismantling would have to encompass a large portion of the wall in order to guarantee the best connection between old and new parts. In certain cases, extra columns or reinforcements have to be considered to reestablish the wall's structural integrity.

Timber structure

In case of wattle and daub or timber framed structures, repairs will identify which elements have to be changed or repaired. The versatility of timber materials enables many different applications in addressing structural wall repairs in adjoining a metal plate or extra timber structure until the stud has completely changed. Usually, the



Figure 23 Wall stitches principle & pictures

⁹ Sometimes referred to as "land-recycling"

restoration of the infilling including minimum protective plastering is adding to the work load. In case of timber structure, a bracing will be done on each facade.

Construction/reconstruction

Estimated cost if applicable: up to 3,060 USD

For the foundation, construction/reconstruction of a wall is usually easier and much simpler than structural repairs. A broad range of materials and techniques can be used and prior to initiating such interventions, partners should establish eco-friendly criteria in order to select the most appropriate materials and implementation methods.



Figure 25 Timber framed wall inspired by North American Balloon Frame construction. Please note that wooden studs located on close interval are assembled as a panel as the load bearing structure. (Sloviansk, Dobraya Vest 2015)



Figure 24 Concrete Block masonry, (Slovaisnk. ADRA 2015)

Upper Ring beam

State Construction Norms of Ukraine: Buildings and constructions structures. Composite steel and concrete structures. General rules. B.2.1-10-2009

(UKR: ДБН В.2.1-10-2009 Бетонні та залізобетонні конструкції. Основні положення)

The upper ring beam has two important functions: one is to align the roof load principle with the walls of the building and the second is to align the walls with the floor, thus creating continuous symmetry between the floor and the roof. Generally, floor and roof stages are assembled on the ground level. In the construction phase, the ring beam structure is lowered to install the floor stage to the ground floor wall structure and released to permit the installation of the roof which is lowered and attached to the upper wall structure.

Structural repair

Estimated cost if applicable: up to 120 USD

Even though upper ring beams are not mandatory in housing constructions, they are strongly recommended on damaged buildings in order to maintain the building's structural integrity.

Usually ring beams are made by a reinforced casted concrete beam, a cheaper alternative could be done in converting the wall plate¹⁰ increasing the wall beam to a size that is sufficient enough to guarantee better load sharing. The recommended section should be a minimum of 100 x 100 mm and on average 150 x 150 (2x70X150).

Construction/reconstruction

Estimated cost if applicable: 80 USD

Depending on the masonry material available (concrete block, foamed or not, or burnt brick), a cost saving trick is to use the ring beam as a lintel for door and windows.

In the case of a timber structure, the ring beam is not anymore a requirement as its function is replaced by the wall plate. Instead the upper frame will be properly braced.



Figure 26. Concrete Casted upper ring beam, please note that concrete framework was not yet removed

¹⁰ Wall plate is recommended to not be less than 100 mm.

Ceiling

State Construction Norms of Ukraine: Roofing of building and construction works. Chapters 1,2 and3 B.2.6-14-97

(UKR: ДБН В.2.6-14-97 Конструкції будівель і споруд. Покриття будинків і споруд)

Usually considered as a finishing and non-capital element, the ceiling could be included in the scope of work of the intervention in certain cases where they are linked to a damaged upper floor.

Structural repair

Estimated cost if applicable: up to 540 USD

Construction/reconstruction

Estimated cost if applicable: 480 USD



Roofing

State Construction Norms of Ukraine: Roofing of building and construction works. Chapters 1,2 and3 B.2.6-14-97

(UKR: ДБН В.2.6-14-97 Конструкції будівель і споруд. Покриття будинків і споруд)

State Construction Norms of Ukraine: Wood construction. Terms. B.2.6-161-2010

(UKR: ДБН В.2.6-161-2010 Дерев'яні конструкції. Основні положення)

Shaping the general look of the house, roofs can be simple, pitched or more complex, such as hipped or mansard styles.

Along with the carpentry detailed in a subsequent section, roofs are made with a cladding/covering material to protect them from external conditions. Cladding could be non asbestos concrete roofing sheet, tiles or Corrugated Gauged Iron sheet (CGI). Furthermore, a vapour barrier usually will prevent the penetration of rain water. If the attic space is not accessible, the vapour barrier could be fixed directly under the external roof cladding. In case of an accessible attic enclosed space, insulation will lead to use a vapour permeable foil under the cladding and the vapour barrier under the insulation.

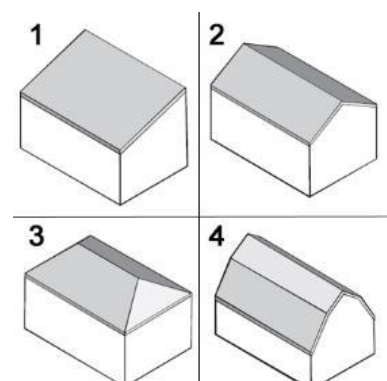


Figure 27 (1) single; (2) pitched; (3) hipped; (4) mansard roofs



Even if Ukrainian Legislation still accepts asbestos roofing materials which are still widely produced in the country, Asbestos is officially and strictly banned by main donor countries due to its health-related risks. For guidance on proper disposal of asbestos, please see Annex III.

Structural repair

Estimated cost if applicable: up to 1,100 USD

These interventions were broadly implemented in 2015 with light partial repairs and medium –full roof- repairs.

In case of a new intervention, carpentry and roofing will be considered but if an initial intervention was already implemented only indispensable top-up interventions should be considered.

Special fixtures such as roofing nails, ridges, and fascia board are not compulsory. Nevertheless, if wattle and daub technology or repairs are being made using timber, these items are then important to use in construction.

Construction/reconstruction

Estimated cost if applicable: not applicable USD

Attic space can be designed as accessible or inaccessible¹¹, which will determine how insulation will be installed in the ceiling. Insulation can be installed under the roof slope or on the floor between the attic and the ground floor.

Special fixtures such as roofing nails, ridges, fascia board are strongly encouraged to be used, especially if the construction technology will use timber structure, wattle and daub, and straw bale forms of construction, which specifically requires acute attention to the construction details.

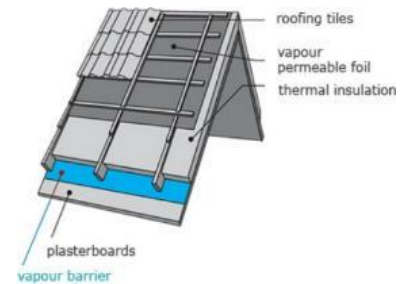


Figure 28 Principle of roof cladding with underlying vapour permeable foil



Figure 29 Asbestos free roofing material. People in Need, Sloviansk, 2016. Credit R Lunin

¹¹ Accessible (stair-way installed) and non-accessible (requires a non-adjointing ladder)

Carpentry

State Construction Norms of Ukraine: Roofing of building and construction works. Chapters 1,2 and3 B.2.6-14-97

(UKR: ДБН В.2.6-14-97 Конструкції будівель і споруд. Покриття будинків і споруд)

State Construction Norms of Ukraine: Wood construction. Terms. B.2.6-161-2010

(UKR: ДБН В.2.6-161-2010 Дерев'яні конструкції. Основні положення)

The carpentry of the structure is more commonly built with timber, which will support the roof cladding and all external loads related to snow and wind.

This cost effective approach would require a minimum trust dimension and the simplest design. However; due to the particularly competitive prices of timber in Ukraine, more advanced designs could also be considered.

Structural repair

Estimated cost if applicable: up to 550 USD

Structural repairs are usually focused on changing or repairing the principal carpentry made from trusses and to rehabilitate the secondary carpentry with planks or battens.

Construction/reconstruction

Estimated cost if applicable: 750 USD

Accessible attics could be considered especially if beneficiaries contribute to equip the attic with proper insulation and electricity. In this case, the top-up in terms of investment will enable a significant increase in the area provided at a minimum of cost.

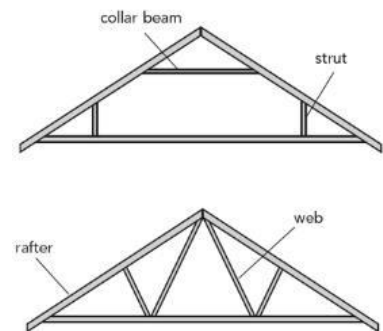
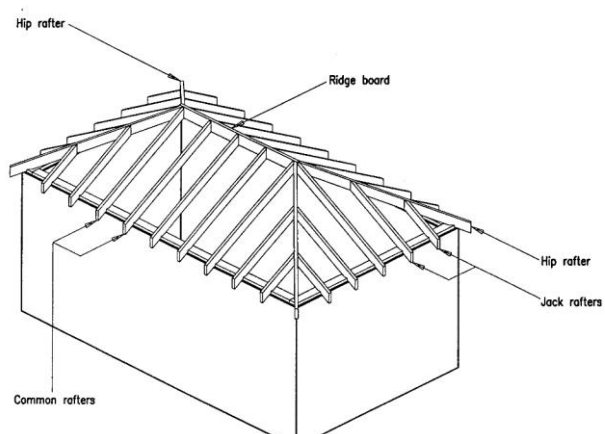


Figure 30 Attic trusses and simplest W trusses



Insulation

State Construction Norms of Ukraine: Thermal isolation of buildings. B.2.6-31-2006

(UKR: ДБН В.2.6-31-2006 Теплова ізоляція будівель)

In harsh winter climates, insulation is critical for any durable solutions related to permanent stay. Shelter Cluster winterization guidelines already provided detailed guidance on the most appropriate materials and interventions.



Structural repair

Estimated cost if applicable: up to 315 USD

Insulation should be installed in the walls and upper surfaces (roof or ceiling) of all rehabilitated living areas or bedrooms, in addition to the bathroom and kitchen in order to avoid pipes freezing during the winter and exploding, causing subsequent flooding or other interior household damage.

If the walls have a good thermal insulation coefficient, which can be provided through foam or concrete blocks or straw bale techniques (**Annex II**), any complimentary installation of insulation panels can be minimum. If the techniques create a cavity wall from burnt brick or masonry from concrete block, an equivalent of 100mm rock or glass wool has to be installed on each facade.

Any non-rehabilitated rooms do not require insulation. Due to the fact that the entire house area will not be fully repaired, it is recommended that the insulation for the upper part of the house should be on the ceiling level and not under the roof slope. If the area of the house is pretty small and beneficiaries are topping up the house with insulation materials for other rooms of the house or the gable wall, insulation should then be installed under the roof slope.



Figure 31 Insulation on attic floor, the volume of the attic increases the thermic performance



Figure 32 Insulation along the roof slope, more details have to be foreseen with vapour foil and vapour proof membrane but the volume underneath is usable.

Construction/reconstruction

Estimated cost if applicable: up to 520 USD

If beneficiaries do not foresee much use of the attic, the best location for insulation is within the ceiling, which will also benefit from the volume of the attic itself.

If the Attic is fully accessible and in use by beneficiaries, insulation will have to be set up under the roof slope with proper vapor barrier and vapor permeable foil – see paragraph on roof-.



Figure 33 Classic air leak affecting insulation performance

Heating system

State Construction Norms of Ukraine: Heating, ventilation and conditioning. B.2.5-67-2013

(UKR: B.2.5-67-2013 Опалення, вентиляція та кондиціонування)

The harsh winter climate can lead to 2 or more sources of heat, namely as a primary and secondary sources. These guidelines have elected to concentrate only on the primary source of heat, and an extra heater could be provided in winterization exercise.



Structural repair

Estimated cost if applicable: up to 240 USD

Depending on if the house is connected or not to the main utilities network the choice of the heating system may vary significantly. In case of multistoried buildings, central heating system repairs could be fully considered.

In case of solid fuel stoves, particular attention will be paid to fire security and safety especially with smoke pipes and proper stovepipe wall outlets.

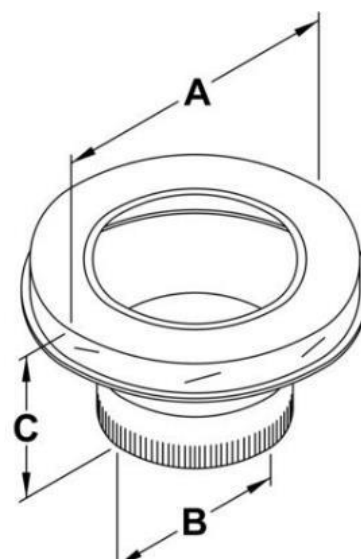


Figure 34 Special outlet to pass the smoke pipe through wall: wall thimble

Construction/reconstruction

Estimated cost if applicable: up to 240 USD

Construction, and reconstruction require systematically providing a heating system according to the housing context and appropriate system (gas network, municipal heating system, individual solid fuel stove). Each house and residence should be assessed to see which heating system would be the most appropriate:

1. Communal heating system
2. Electrical heater
3. Coal stove
4. Briquette/pellet

Wood stoves may be used in only very rare and particular cases due to the high level risks of fire. Certain categories of vulnerabilities are not as easily able to operate these stoves.

In case of traditional individual solid fuel stove, increasing the thermic inertia with burn brick masonry could be considered.



Plumbing

State Construction Norms of Ukraine: Internal plumbing and sewage system B.2.5-64-2012

(UKR: B.2.5-64-2012 Внутрішній водопровід та каналізація)

As a critical component for permanent stay in the accommodation, plumbing and water and sanitation are essential and include water piping, sewage piping, water heater, one kitchen sink, one-bathroom sink, shower tray, toilet and adequate tap plus fixtures. Connections are usually considered until the plot edge. Usually all features to be provided are considered simple and solid.

Structural repair

Estimated cost if applicable: 250 USD

According to what is remaining of the previous installation, repairs will fix plumbing systems and if necessary insulate exposed pipes in order to avoid water freezing and expansion.

Construction/reconstruction

Estimated cost if applicable: 500 USD

According to the list mentioned above, the plumbing system should try to be compacted in order to avoid unnecessary piping.



Electrical system

State Construction Norms of Ukraine: Electric equipment objects designing of civil purpose B.2.5-23-2010

(UKR: B.2.5-23-2010 Проектування електрообладнання об'єктів цивільного призначення)

Electricity is quite an important part of the utilities and its presence contributes greatly to permanent stay. If it is to be replaced, the network will be grounded with a box and a meter plus a switch board. Fuses have to be considered for isolating each room independently. 2 sockets are required in each room and 3 are required for the kitchen.

When working on an electrical connection for a single plot, the electrical connection should only be considered till the plot edge or the nearest electrical pole (not more than 50 meters from plot edge).



Summary of indicative cost

Items	Structural repairs (3 persons average)			Reconstruction (2 persons average)		
	average qty	cost/unit	average cost	average qty	cost/unit	average cost
Foundation/wall basement	2.0 m3	\$ 90.0	\$ 180.0	6.3 m3	\$ 70.0	\$ 443.5
Floor	3.6 m3	\$ 15.0	\$ 54.0	6.0 m3	\$ 15.0	\$ 90.0
Opening windows, doors			\$ 530.0			\$ 530.0
Walls	2.0 m3	\$ 180.0	\$ 360.0	25.5 m3	\$ 120.0	\$ 3,060.0
Upper ring beam	1.2 m3	\$ 100.0	\$ 120.0	1.0 m3	\$ 80.0	\$ 76.8
Ceiling	36. m2	\$ 15.0	\$ 540.0	24. m2	\$ 20.0	\$ 480.0
Roofing	110. m2	\$ 15.0	\$ 1,650.0	27. m2	\$ 25.0	\$ 675.0
Insulation	78. m2	\$ 4.0	\$ 312.0	130. m2	\$ 4.0	\$ 520.0
Heating system	4 units	\$ 60.0	\$ 240.0	3 units	\$ 60.0	\$ 180.0
Plumbing	1. m2	\$ 250.0	\$ 250.0	1. m2	\$ 500.0	\$ 500.0
Electrical system	1	\$ 180.0	\$ 180.0	1	\$ 300.0	\$ 300.0
Furniture				1. m2	\$ 1,000.0	\$ 1,000.0
			\$ 4,416.0			\$ 7,855.3

All prices for structural repairs are only indicative and should be considered as an average. In reality and according to each object, the amounts could vary significantly.

All prices are excluding VAT, transport, large contractors and are based on group purchasing approach.

ANNEX I General Provisions on Residential Buildings (DBN)

Ukraine's Ministry of Regional Development and Construction last published the "General Provisions on Residential Buildings" (known better by its abbreviation in Russian: DBN) in 2005. A draft version of the 2015 DBN was never published, so the following is an overview of these 2005 standards and the most pertinent considerations for structural repairs.

2.24 Minimum dimension areas for sleeping, living, and working

Single bedroom apartment	Multi-bedroom apartment
- Living room area minimum 15m² - Minimum sleeping area for one person 10m² - Minimum kitchen area is apartment is 7m² - Minimum working area is 10 m²	- Living room area minimum 17m² - Minimum sleeping area is 14m² for 2 people - Minimum kitchen area is 8m²

2.27 Minimum dimensions for bathroom and lavatories

Single bedroom apartment	Multi-bedroom apartment (2-3 bedrooms)	Multi-bedroom apartment (4 or more bedrooms)
- Combined toilet, bathtub, place for washing machine - Minimum space 3.8 m²	- Lavatory should be separate from washing space (bath with a sink in one room with a lavatory and toilet and sink in another room) - Bathroom (bathtub, sink, place for washing machine)- 3.3m² - Toilet (lavatory equipped with toilet and sink)-1.5m² - Toilet (lavatory equipped with toilet and without sink- 1.2m²	- At least 2 toilet facilities should be installed - At least two of each (lavatory and washing room) should be available with the same minimum dimensions of multi-bedroom apartments 2-3 rooms

2.30 Width of circulation areas in apartments

Type of area	Minimum dimensions
Kitchen	1.8m ²
Hallway	1.5 m ²
Corridors leading to living rooms	1.1m ²

2.31 Gas boilers installed in kitchens

Kitchens equipped with gas boilers need to be provided with adequate air inflow through the installation of vents or small drilled holes with at least .02m² opening placed near the bottom of the door near the floor.

2.34 Entrances and openings

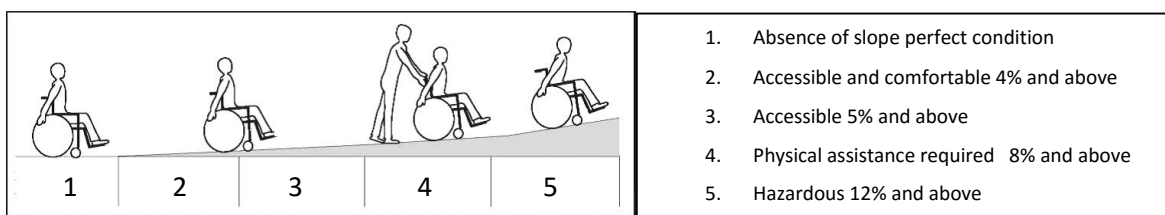
Entrances and apartment opening should be designed and reinforced with screws and fasteners in accordance with International Standards (ISO B V.2.6-11) and be in compliance with fire resistance standards EI¹² 30.

For the opening of the apartment, one should consider the width of the doors when opened and how it relates to the space within the immediate exterior and interior of the apartment opening.

2.38 Apartment buildings for the elderly and handicapped

- For apartment buildings which are housing the elderly and the handicapped the entrance hallway to the apartment buildings should have no obstacles such as steps to the entrance to elevators or rubbish chutes to enable easy access.
- In such cases where there is a step to enter into these elements, ramps with a width of at least 1.2 m with a slope of no more than 1:20 ratio should be installed or appropriate elevators should be installed to help those with disabilities and limited mobility.
- The width of the corridors immediately to the outside of the apartments should be at least 1.8m. The width of the outside doors shall be no less than .9m. An entrance platform or an entrance to a building should be least 1.5 m deep.

2.39 Entrances and openings for elderly and disabled

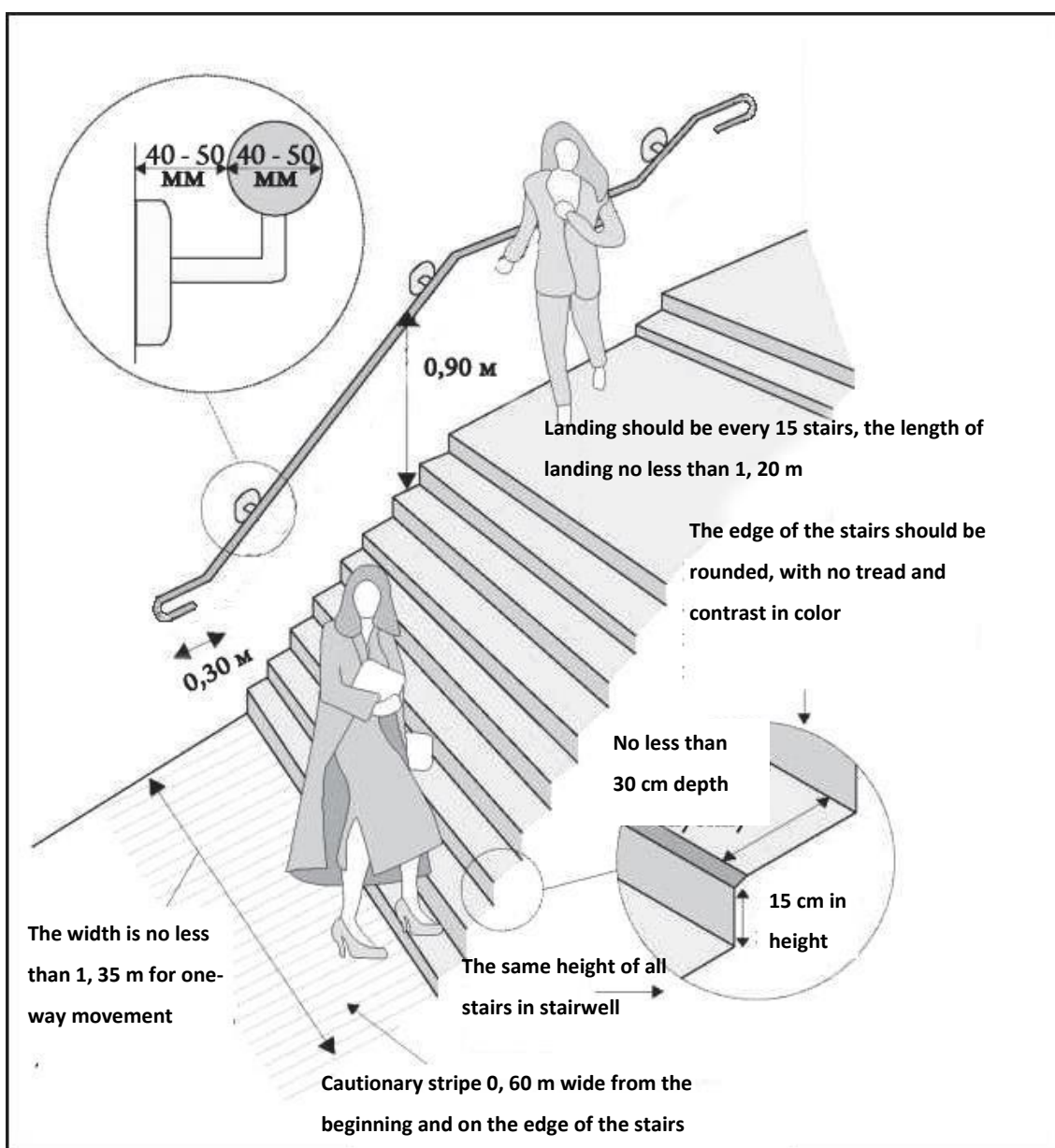


Balconies and apartment openings for elderly and disabled people are required and should be no less than 1.5 m wide.

¹² Fire-resistant glass in this category offers highest level of protection from fire, smoke and radiant heat for a defined period of time (from 30 up to 180 minutes).

Circular areas for people who are in a wheelchair should be the following:

What	Dimensions
Kitchen for basic wheelchair	2.3m minimum width
Kitchen for amputee wheelchair or angular equipment	2.9m minimum width
Hallways of apartment buildings	1.6 m minimum width (space for storing wheelchairs should be provided)
Hallways within apartments	1.15 m minimum width
Combined toilet and bathroom facilities	At least 2.3m x 2.3 m area
Lavatory and sink	Maximum height 2.2 m
Lavatory without sink	1.2 x 1.6 m



Considerations on Water Supply and Sanitation

5.13 Water supply in residential buildings

Residential buildings must be equipped with drinking water supply of cold and hot water, domestic sewage, rainwater drainage and internal fire water pipeline system according to Ukrainian construction standards.¹³

Requirements for putting out fires and for water and sanitation systems of residential buildings are found in more detail in the construction premises.¹⁴ Built-in housing facilities for public use shall be equipped with water supply and sanitation according to design specifications of these premises.

For rural communities which have no centralized network of water supply and sanitation with basic engineering equipment such as water supply from boreholes or wells or connection to local waste treatment plants, potential works could be carried out to bring these low-rise residential buildings in compliance with safe water-drinking standards in State Sanitary regulations and standards 383.¹⁵

5.21 Sewage and water supply

For single-family homes connected to individual water and waste systems, water supply systems can be designed with permeable membrane container and pump which are automatically controlled by water pressure.

Single-family private homes not connected to sewage systems should consider the installation of pit latrines at the rear of the room or to the side of the wall façade. The cesspit should be dug at .5 m per person, should be cleaned annually. If the cesspit is at .25 m deep, it should be cleaned twice a year. The bottom of the cesspit should be water proof and located no less than .5 m above ground water level.

Heating, ventilation and air conditioning

Gas supply

5.37 Warning and monitoring gas supply

The development of internal gas supply projects in residential buildings should be done in accordance with Ukrainian National Construction regulations DBN 2.5-20

In planning construction and repairs on crawl space, lower ground floor, basement, ground floor and in their absence of the first floor of residential buildings of gasified communities, there should be mechanisms in place to monitor potential explosive concentration of fuel gas in the air. An alarm system should be installed for warning inhabitants about dangerous fuel levels and for notifying emergency services.

¹³ <http://kga.gov.ua/files/doc/normy-derjavy/dbn/Budynty-i-sporudy-ZhYTLOVI-BUDYNKY-OSNOVNI-POLOZhENNJa-DBN-V22-15-2005.pdf>

¹⁴ Ibid.

¹⁵ http://ecounit.com.ua/artikle_88.html

Electric devices

5.39

Kitchens in residential buildings with 11 floors and more and homes for elderly people and families with disabilities (regardless of the number of stories) requires the installation of electric stoves to mitigate the risk of fire.

For buildings with 11 or more stories, apartments should have similar heights and electrical requiring.

Electric installation of centralized heating systems is allowed depending on the construction design and agreement by the electrical company.

ANNEX II Principal techniques identified for Ukraine

Given available materials, existing practices, and conditions in Ukraine, the following techniques could be implemented when undertaking structural repairs or reconstruction on households.

Traditional “wattle and daub” repairs



Even if this technique is more suitable to repair old damaged houses, the system can still be used for new construction especially if projects would mainstream eco-friendly considerations into the construction design. Native to Ukraine but also used in many other places in the world, Wattle & Daub techniques were often under-appreciated due to the common perception that is linked to poor and fragile dwellings.

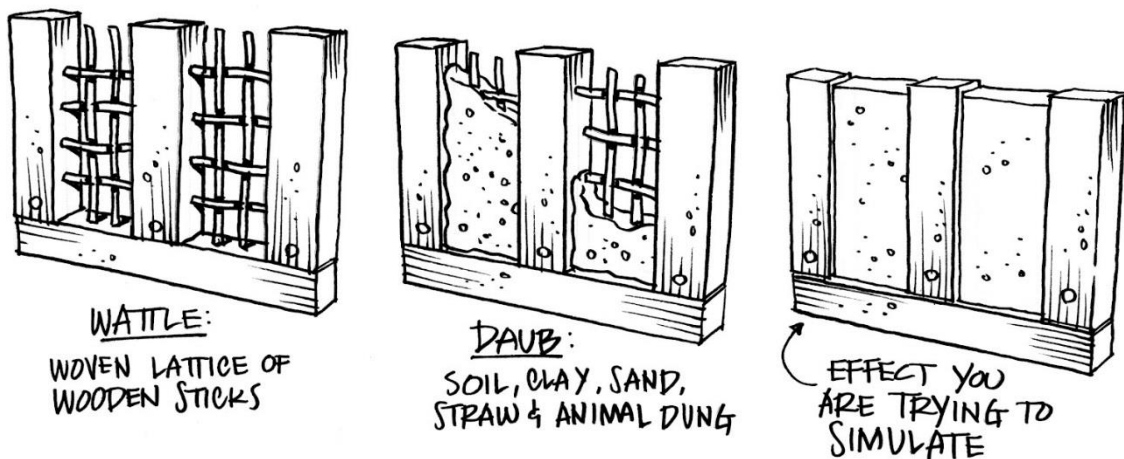


Figure 35 Damaged wattle & daub house. People in Need assessment in Nikishine, 2015. Credit R. Lunin

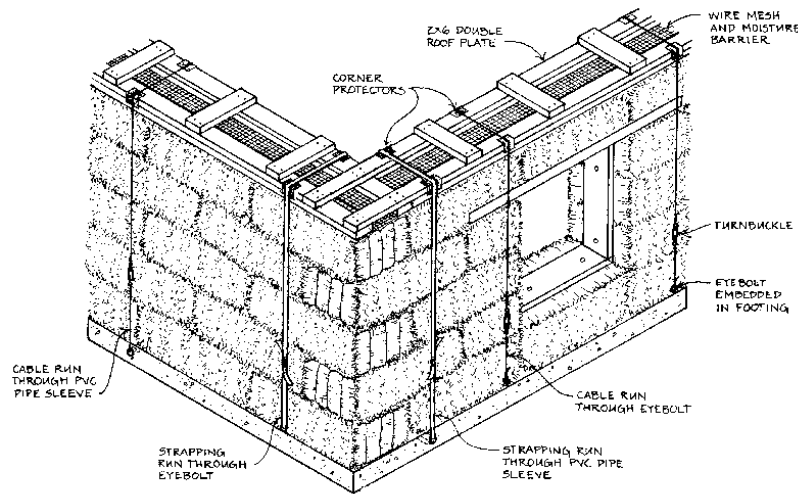
With the recent rise of eco-friendly architecture, wattle and daub can be a suitable technique mixing good insulation characteristics with cost effectiveness and the possibility of participatory construction especially with the earth wall infilling phase. No standards are available in Ukraine leading to a full endorsement of liability by beneficiaries.

In term of technology, the implementation requests an advance knowhow in terms of design but also for construction and technical details (for example special rendering to protect wall face, treatment for technical duct and electricity, large roof hangover etc.).

UNDERSTANDING HOW TIMBER WALLS ARE CONSTRUCTED:



Alternative eco material, Straw bale technology



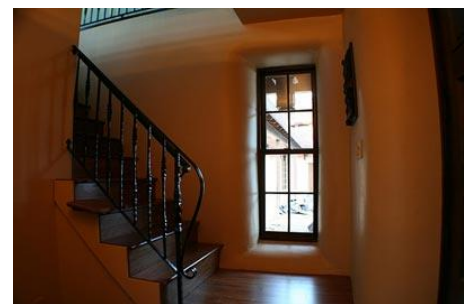
One of the cheapest eco-friendly construction techniques, straw bale is using the thermic insulation property of a medium thick wall to increase the energy efficiencies of the house which can be shaped into a modern design.

As for wattle and daub, technical details such as the foundation, roof overhang and proper plastering composition are critical to guarantee the structural

longevity of the building.

The technology is functioning on the principle of walls made from large straw bales bonded together by planks every 2 layers and/or tied with a metallic cable. Usually straw bales for construction are prepared using the same machine but are more compacted and drier than the agricultural one.

It is more and more common to see Europe, Canada and the United States using this methodology as a sustainable alternative, with advanced technologies using the rendering on wire mesh to increase its durability.



Sandwich panel construction

Sandwich panels construction are broadly used in industrial buildings. Based on the principle of associating different roles from the same materials, panels provide structural, insulation, waterproofing and cosmetic functions.

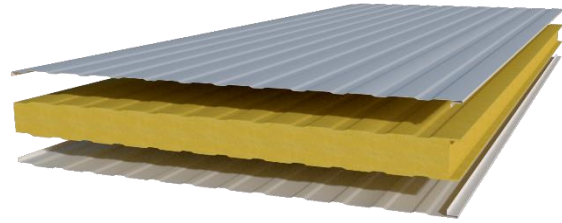


Figure 36 Industrial metal face sandwich panel

Sandwich panels were used in the 2013 humanitarian response in Lebanon by the Danish Refugee Council and could be a linkage between shelter and livelihood projects.

A properly equipped workshop could produce a large quantity of sandwich panels per day prior to installing them on site due to the simplicity of the operation (cutting, assembling, gluing).

The panels themselves are usually composed of a structural frame (optional if insulation foam is dense enough), an insulation infilling, an external protective cladding face and an internal cosmetic face.



Figure 37 Wooden face sandwich panels more adapted for housing

Sandwich panels could vary in dimension and usually thicker they are, better is the insulation. Further their face could vary in term of shape and materials replacing usual iron sheet by timber.

At last the sandwich panel for roofing could be interesting in replacing the traditional support roofing plank and insulation, creating savings in energy consumption and in installation.



Figure 38 Sandwich panels are used instead of roofing plank, insulation, water barrier and ceiling, which is especially relevant if the attic space will be accessible.

Traditional brickwork

The prevalence of burnt brick in Ukrainian construction especially for multistoried buildings is linked to a strong tradition in bricklaying and makes this material relevant for heavy repairs and construction projects.

One of the main advantages of masonry using burnt bricks is that part of the material could be salvaged by beneficiaries. Salvaging concrete blocks might be more complicated especially if the mortar used in the previous construction was high quality.

Bricklaying in cold climates require the use of cavity wall techniques in order to upgrade the wall's thermic insulation capacity.



Figure 39 Brickwork with concrete block and burnt brick. People in Need assessment in Nikishine, 2015. credit R. Lunin

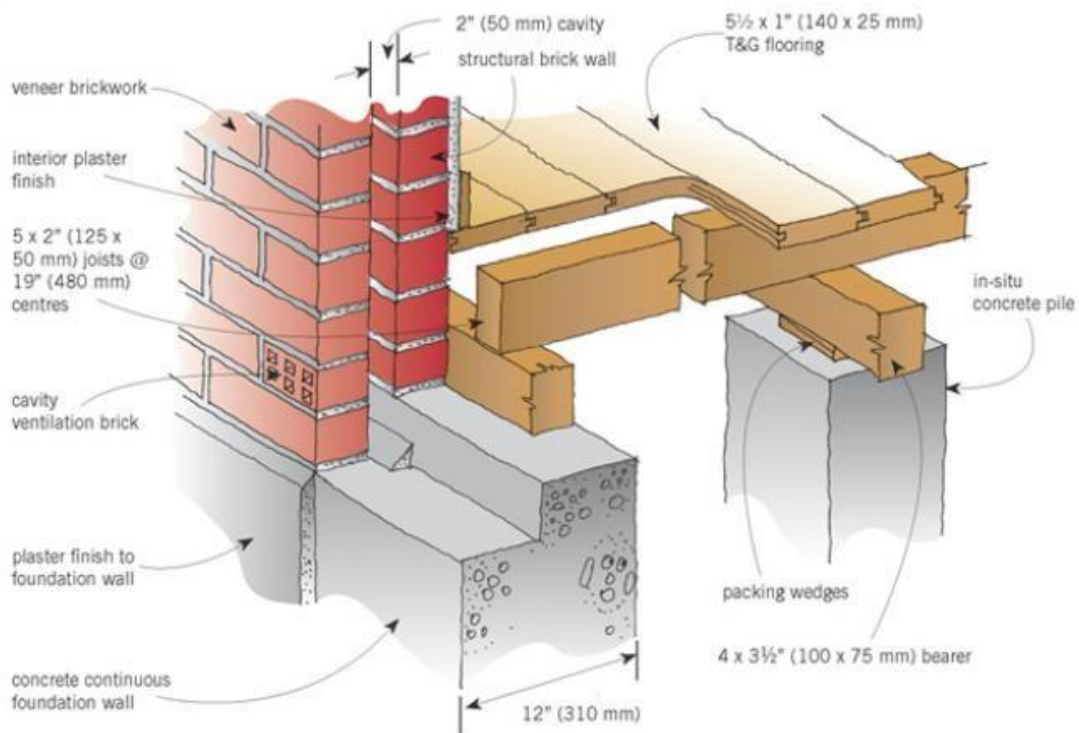


Figure 40 Scheme of cavity wall with construction details. Please note the ventilation block for the cavity, the edge the cavity to evacuate damp, the stepped foundation in order to reduce damp rising. The construction details from international practices are not fully compatible with Ukrainian standards with for example the absence of wall insulation material on both wall and floor levels.

Foam concrete blocks



Cellular Lightweight Concrete (CLC) or foam concrete block is similar to regular concrete block properties with the difference being that the blocks themselves are including 20 to 40% of the volume of the air bubble in order to increase thermal performance. This material is locally produced in Ukraine and could be interesting for construction of new small cottage house which is 3 to 10 times more thermally efficient than regular concrete.



Like many concrete products, CLC comes in many different shapes and dimensions.

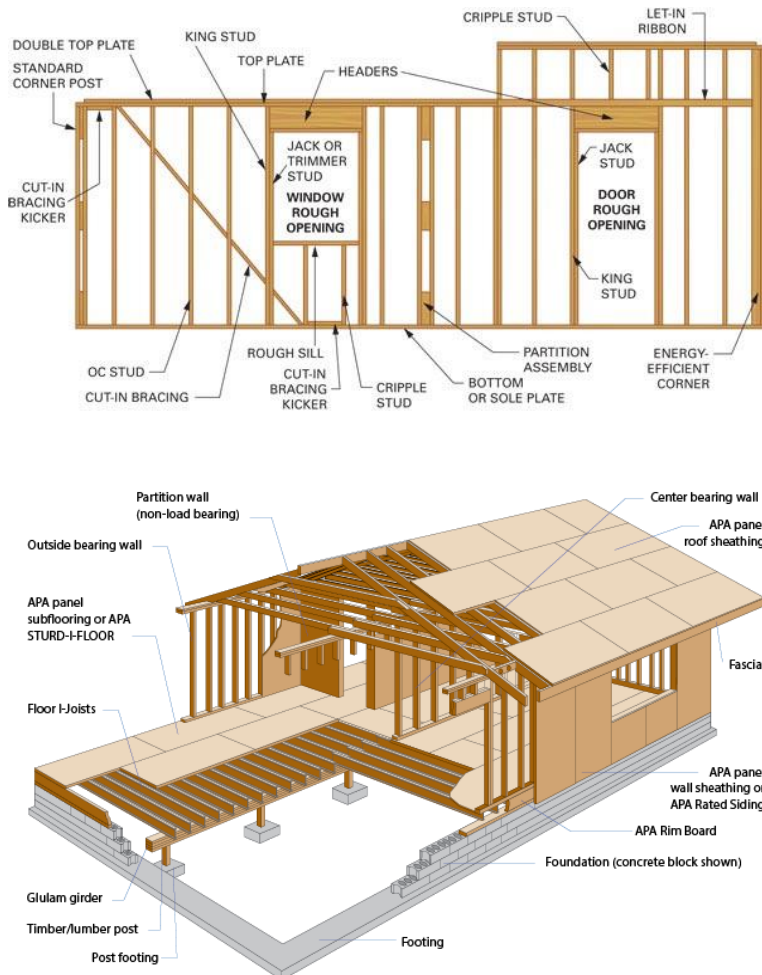
Figure 41 Foam concrete block,
Luxembourg red cross, Sloviansk 2016

Material	Density, kg/m ³	Thermal Conductivity W/mk	Type
Concrete	2400	1.3	Constructional
Porous clay brick	2000	0.8	Constructional
Foamed concrete	1200	0.38	Constructional
Foamed concrete	1000	0.23	Hybrid
Foamed concrete	800	0.18	Hybrid
Foamed concrete	600	0.14	Hybrid
Foamed concrete	400	0.10	Heat-insulated

Timber 'balloon framed' construction



With abundant and sustainable Ukrainian forests, timber balloon framed construction could be considered as a very suitable form of construction. The price per cubic meter, and the absence of termite or similar threats make the technology appropriate.



Initially used in North America, balloon frame is using a structure made from regular and narrow spanned vertical studs. The regularity of the structure permits the use of a standardized small section of timber and planks. The infilling usually includes insulant materials and the internal and external cladding has different materials, waterproof for the external face and breathable for the inner wall. With experience, a team of carpenters can build a one story small house in very little time. Prefabrication of panels or of the entire facade in a workshop prior to installation on site could further accelerate the construction process.

Annex III Waste Management

The use of asbestos and other environmentally harmful substances in construction of apartment buildings and houses in Ukraine is still a prevalent practice. In 2006, 110,000 tons of chrysotile materials were produced annually for asbestos containing substances¹⁶. These substances have been used in roofing slates and other components of Ukrainian houses. Ukraine's production of asbestos is exported to other countries, demonstrating the comparative advantage that Ukraine has in its production and its economic incentives in continuing its production.

Shelter partners' have encountered the presence of such asbestos and other hazardous materials when surveying damaged houses in Ukraine's crisis impacted areas. While still being supported by Ukrainian legislation and an often cheaper material, the **use of asbestos materials is prohibited in humanitarian assistance due to its damaging health impacts**. Asbestos's harmful impacts often stem from its release of air-borne particles which accumulates from micro-particles in a non-degradable form in the human body contributing to cancer and other lung and life-threatening diseases. Asbestos may be commonly found in the following list¹⁷ which is far from exhaustive:

Exterior	Interior insulation
- Asbestos cement pipes (drainage pipes) - Roof felting - Ashphalt shingles - Soffit boards - Stucco and textured paints - Asbestos cement siding - Brick mortar - Window putty - Under decks or porches - Asbestos cement shingles	- Spray-applied insulation (acoustic and fireproofing) - Vermiculite (blown-in) insulation (in attics or wall cavities) - Paperbacking on fiber glass insulation
Flooring	Heating (HVAC) and ducting
- Vinyl sheet flooring and mastic - Vinyl floor tile and mastic - Poured flooring/levelling compound - Asphalt flooring - Vinyl sheet flooring with asbestos backing	- Furnace duct taping - Furnace/boiler insulation - Pipe (mechanical) insulation - Hot water tank insulation - Mastic - Asbestos rope and gaskets - Asbestos cement board - Asbestos cardboard insulation
Walls and ceilings	Others
- Drywall mud - Plaster - Asbestos cement board - Textured coatings - Ceiling tiles	- Fireplace box and mantel - Artificial fireplace logs and ashes - Fire doors - Insulation on electrical wiring - Fire blankets - Chalkboards - Heat reflectors

¹⁶ Asbestos: The Human Cost of Corporate Greed
http://www.ibasecretariat.org/human_cost_corp_greed_en.pdf

¹⁷ Safe work practices for Handling Asbestos

	• Penetration firestopping • Light fixture backing (pot lights)
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Exposure to asbestos can occur not only during construction but also for those who reside in buildings where friable asbestos was used in insulation.

The following steps should be taken with respect to waste management of asbestos materials found on site:

- 1. Handling-** Roofing pieces can be treated with water to limit the fibers from being released into the air.
- 2. Storage**
 - a. Storage of such waste in sealed and airtight containers should be a temporary solution.
 - b. The containers should be labeled to communicate clearly that they contain hazardous materials.
 - c. Containers should be in a controlled access area.
 - d. Personnel handling the waste should be properly trained in the handling and shipping of such waste.
- 3. Transportation**
 - a. Asbestos containing containers require appropriate labelling, packaging, labeling, and documentation.
 - b. Asbestos materials should be transported to a landfill where proper waste disposal should be applied.
- 4. Asbestos exposure mitigation**
 - a. Workers who are required to handle asbestos should be trained on how to use and access appropriate protective equipment.
 - b. Safe handling and disposal of asbestos
 - c. Health education
- 5. Disposal**
 - a. Disposal and burial of asbestos at the local landfill must be approved by relevant local authorities.
 - b. Asbestos materials should be buried and covered with 1.5 m of cover material (locally available soils, refuse or other materials) so that the cover is not ruptured to prevent particles from being released to the air.
 - c. If the landfill practices open burning, asbestos materials should be in a separate dedicated trench to ensure that the materials are not released into air.
 - d. A second option for waste disposal, if available, is to contract a dedicated waste management company.¹⁸

¹⁸ <http://www.enr.gov.nt.ca/sites/default/files/guidelines/asbestos.pdf>

As alternative for the roofing sheet, a major Ukrainian company based in Ivano Frankisk is producing asbestos free compatible roofing sheet. The contact information for Ivano Frankisk is:

*JSC "Ivano-Frankivsk Cement" 77422
Ivano-Frankivsk region Tysmenytsya district
v. Yamnytsya, Ukraine*

More information is available on the company's [website](#). Other companies based in Lithuania, Poland and Turkey are also exporting to Ukraine their European Union approved products.

For more resources on international best practices for waste disposal, please see the World Bank's *Good Practice [Note: Asbestos: Occupational and Community Health Issues](#)* and the [Guidelines for the Management of Waste Asbestos](#).

Re-use of materials and Recycling

Provided materials are safe and not deemed hazardous, they can be re-used in heavy and structural repairs. Materials should be carefully assessed in order to determine if they are fit for durable re-use or for permanent disposal.

Recycling of materials can have positive environmental and economic impacts for communities where it is employed. The potential for recycling programs should be assessed according to local available technologies and market value for recycled materials. For more information on waste management techniques in post conflict and disaster, please see the [guidance](#) from *Planning Centralised Building Waste Management Programmes in Response to Large Disasters*.

Disposal, recycling, and re-use of materials can involve community members provided that they are provided with the adequate protection from hazardous materials that are found near damaged homes.

Engaging community members in waste management

Projects can be designed to create community building and cash for work opportunities for to remove waste from communities. Modalities described in Annex IV are particularly pertinent for mobilizing communities and selecting beneficiaries.

In designing proposals or in contracting workers for the removal of asbestos, organizations are highly recommended to observe proper safety work procedures, highlighting the risks associated with each step of the asbestos removal process.

Asbestos removal projects should be carefully designed to involve only those workers who are and will be trained in removal of asbestos. For example, a skilled worker can be selected from a company who has been engaged in such waste removal projects previously along with several other unskilled laborers. This scheme requires organizations to budget time for training and capacity building of the selected workers.

Protective gear should be compiled of gloves, proper foot ware, face masks, and follow the following conventions:

1. Materials that resist penetration by asbestos fibres.
2. It should cover the body and fits snugly at the neck, wrists, and ankles
3. It should cover the head
4. Feet should be covered preferably with laceless rubber boots
5. Protective gear should be also easily repaired or replaced if damaged.

For more detailed information on safety procedures when dealing with asbestos of many forms, please see the Safe Work Practices for Handling Asbestos at the following [link](#).

ANNEX IV Community Mobilization methodologies

1. Involvement of beneficiaries to encourage rehabilitation

Durable solutions through structural repairs or reconstruction have a **secondary benefit** in that they can assist crisis-impacted beneficiaries in rebuilding their lives, **alleviating them from post-traumatic impacts** of conflict. A rebuilt house can signal that life can continue despite the hardships endured. Participation and working jointly on such repairs with other community members can give a sense of confidence to an individual to confront the adversity and reduce their dependency by enabling them **to take their first step beyond the life lines that were sustaining them in the immediate aftermath of the crisis**.

Based on experiences in other contexts, communities actively involved in rebuilding their homes are **better able to move through the mourning and healing process** and contribute positively to their communities, thus **experiencing natural psychological support**. To maximize the secondary benefits of such positive community engagement, partners are encouraged to implement such projects through regular **consultations** with community-based groups and volunteer groups in addition to local authorities, as an important stakeholder.

2. Scope of responsibilities and cash for work with Category III and IV Reconstruction

Especially in light of the lack of technical capacity for construction found in many communities in Ukraine, cash for work can be used primarily in light preparation of construction sites such as waste removal or transportation of materials on site. If involving workers in more structural interventions, it is important to ensure that proper work site supervision is in place. Consequently, these types of interventions should have the proper certification in place to ensure that construction works are meeting appropriate standards.

3. Beneficiaries' participation

Given the positive benefits of beneficiary participation, the following are important principles to consider for effective beneficiary engagement:

1. **Attempt to transfer ownership of the projects in the early stages of the project.** This means not only involving beneficiaries in the design phases of the works but also in planning and acquisition of materials and work-related resources.
2. **Encourage open communication and transparency with beneficiaries-** Usually beneficiaries may fear exclusion from shelter programs and therefore may not be forthcoming in pertinent information and resources needed for structural repairs and reconstruction works. Where and when feasible, a clearly communicated beneficiary and household selection process, spelling out each stage of the works (pre-selection, selection, design, and implementation) assist families to be more confident and assured that transparent information will be continued throughout the project implementation period.
3. **Define jointly with beneficiaries their level of engagement depending on material and physical resources-**
 - a. If beneficiaries are able to **provide their own resources** or have been able to salvage resources from their previously destroyed homes, a proposition to adapt plans and designs should be done at earlier stages, even if usual quantities are very limited.

- b. If **beneficiaries are able to provide labour**, either with their own man power or indirectly involving a third party, the involvement of such third party labour in the project should be clearly identified.
 - c. In such cases of beneficiaries providing labour, experience has revealed that **traditional groups are not qualified for construction work required for implementing structural repairs and reconstruction**. For example, women in more traditional cultures have already pre-defined manners of participation in such community projects. Prior to involving women and healthy elderly persons in such projects, the need for community consultation is needed to respect prevailing cultures and assign some identified unskilled labour activities.
4. The **Site Work Manager should foresee minimum physical protection**, ensuring that those working on site are provided with working gloves, proper shoes, helmets, tools, and other appropriate materials which would mitigate the risk of accidents.
5. In light of the physical risks inherent on any construction site, work which is required to be done from scaffolding or requires the operation of machinery will have to be done on a **completely voluntary basis**, preferably with waivers signed by those undertaking such activities.

4. Role of cash for work

To link such interventions with early recovery, cash-for-work methodologies involving a non-formal contractual agreement where some works are compensated financially can be implemented. Cash for work is designed to create **temporary work** opportunities to **vulnerable segments of the population** (in the context of Ukraine, this can be able-bodied unemployed individuals) through **small-scale projects** (for these guidelines, focusing on structural repairs and reconstruction). This methodology has several advantages:

- Transfer benefits are small
- It serves as an initial step for income stabilization for crisis affected population
- Prevents distress and negative coping mechanisms (such as selling of assets in adverse market conditions, survival sex, uninformed economic migration, etc.)

Cash for work interventions should be **integrated into implementing partners' program design** and should not be confused with contractual labour.

Cash for work activities are therefore required to have a **specific objective**, focusing specifically on the selected target group of **beneficiaries** and the outcomes that the program seeks to achieve through engaging them in the project. In budgetary terms, the works being implemented should preferably be quantified as a **lump sum**, from which works and individual **remuneration** of beneficiaries are distributed. This specific remuneration to beneficiaries is **not a salary** in that the obligation to produce results is not concretely stated in a contractual form. The cash for work stipend should be presented as an **incentive for reinforcing social cohesion** in order to facilitate volunteers coming together to assist the homeowner complete the repairs to the household. The only condition for reception of cash is the performance of the works, giving the individual participating in such programs autonomy for spending.

Cash for work recommendations and best practices

- Community leaders, community volunteer groups, and local authorities can be involved in beneficiary selection.

- Use of local banking systems in areas where financial supply chains are well-functioning can minimize the risk of corruption and the risks associated with transferring money directly
- When distributing cash, it is important to carefully keep records of those who are receiving cash to avoid people attempting to receive more than they should. Coordination with other implementing partners at an early stage can avoid duplication of activities.
- When distributing cash in areas where financial systems are not operating, direct transfers can be implemented, enhancing verification of documents by implementing partners' program and operations teams in the absence of a banking system
 - For direct distributions, distribution routes for transporting cash to the field should be planned ahead of time with security focal points
 - Select safe locations for remuneration of cash for workers and distribute to smaller numbers of workers at one time
 - Attempt to minimize the distance that cash for workers have to travel between distribution area and homes
- Mechanisms for beneficiary-feedback should be in place such as hotlines established already by many implementing partners in Ukraine.
- Cash for work participants should include physically and socially capable conflict-impacted displaced populations who are physically fit for the assigned labour.
- Those who are not participating either because of being physically unable or because of prevailing social norms (female headed households, handicapped, ill, and elderly) should be given some alternative assistance to compensate for their inability to participate.
- Set appropriate age limits that are reflective of Ukrainian labour laws and customary manners of involving women and able-bodied elderly persons.
- Ensure that workers have appropriate breaks, access to water, and observe Ukrainian labour regulations.

Economic considerations for cash for work

Program design of such interventions should however consider the important **economic impacts** of cash-for-work in the areas which it is implemented:

1. **Cash for work interventions typically work well in the presence of well-operating market systems.**
 - In the context of Ukraine, government-controlled areas are usually primary beneficiaries of such interventions.
 - Non-government controlled areas are currently not integrated with markets in the rest of the country due to its adoption of the Russian ruble as a currency and because of interruption to traditional supply chains, and therefore cash interventions have been complicated. Cash for work in NGCA areas could perhaps be considered, as it would be a small-scale cash injection to NGCA areas that have been assessed as having proper linkages to markets.
 - Communities where supply chains have been interrupted are likely not to be appropriate recipients of cash for work interventions.

2. **Maximizing Short-term Gains-** Cash injections into an environment of appropriately functioning and competitive markets create **an increase in demand in the short-term**.¹⁹ This can be a positive stimulus for communities who have seen their lives interrupted by conflict and can result in beneficiaries being able to meet their most immediate needs. **Appropriate market analysis** should be performed to ensure that supply is adequate enough to meet this temporary spike in demand.
3. **Medium and Long-term risks:** Cash injection in the **medium-term** can create inflationary tendencies and in the **long-term**, price distortions, so program design should maintain a big picture view of beneficiaries who are participating in such cash for work schemes. This means coordinating with other partners to minimize the risk of beneficiaries benefitting from multiple sources of cash. Partners providing in-kind donations in areas where such programs are being implemented run the risk of off-setting the impacts of such rehabilitation programming.
4. **Attempt to minimize the risks of corruption-** Cash injections are often vulnerable to corruption, and transparency and cooperation with local authorities can be a first step for minimizing the risk that beneficiaries become “taxed” on such distributions. Clear communication on who is entitled to receive what amount of money is another step to minimizing the risk of corruption on cash for work interventions.
5. **Opportunities for establishing sustainability to the program-** As donors and implementing partners attempt to promote early recovery in the context of Ukraine, transitional strategies and micro-credit or revolving fund support programs can be established in partnership with longer-term development programs to help families maintain the cost of sustaining their homes and affording the costs of utilities. There are several donors who are establishing plans to roll out this programming in Ukraine.

¹⁹ Paul Harvey and Sarah Bailey “Cash transfer programming in emergencies” Overseas Development Institute June 2011

Annex V Preparation works, HLP, documentation & authorization

House Land Tenure & Property, general consideration

Similar to many humanitarian conflict contexts, violations of housing, land, and property rights are a feature of the Ukrainian crisis. Program design for structural repairs and reconstruction are encouraged to take these considerations into account in order to maximize benefits to shelter beneficiaries. While housing was not a major area of investment for the Government Ukraine in its social development, the number of property rights issues and questions for financing mortgages that have emerged since the start of the 2014 crisis in Ukraine have created the following challenges in the area of access to housing and permanent residency:

1. Contradictory legal and policy framework for displaced persons
2. Lack of adequate and sufficient housing for the displaced
3. Risk of property loss for those who left behind property in NGCA
4. Military occupation of civilian property
5. Unexploded ordinance contamination of crisis-impacted property
6. Lack of security of tenure for displaced persons in rented accommodation
7. Lack of access to legal services especially for those residing in NGCA

Shelter actors working on the aforementioned durable solution programs are provided with a list of detailed guidance on how to address these challenges in Annex III to these guidelines.

HLP, general check list

The Norwegian Refugee Council (NRC) who chairs the Technical Working Group on housing, land and property has compiled a checklist for Shelter Actors which provides minimal guidance for what to do prior to initiating construction works at each stage of construction. Shelter actors are encouraged to cooperate with local authorities and beneficiaries on capital repairs and reconstruction works in order to ensure that proper documentation is in place to prevent the possibility of eviction or loss of property for those residing in the restored premises:

Documents Confirming Right of Ownership or right to use a residential building	Documents confirming the right of ownership or right to use land
• Certificate of ownership • Contract of sale/barter/gift (notarized) • Certificate of inheritance • Certificate of ownership of a part of jointly owned marital property • Certificate of purchase of property at public auction • Contract of lifetime support • Court decision	• State act • Certificate of ownership • Extract from the State Real Estate Register • Decision of a public authority or local government to provide land for use • Superficies agreement • Lease agreement

To keep abreast of the current required documents, it is recommended to cross check the relevance of this list with the State Real Estate Register's most recent extract.

Loss of documentation in the aftermath of conflict is a common occurrence, and the following recommendations are provided for how to respond in such cases:

1. For loss of documents confirming right to ownership or right to use of residential building/land ownership, a certified copy of this document is available with the appropriate ministry which released the document.
2. The state registrar may not be able to provide information on titles to property that predates 2013, in which case one should request a notarized copy of certificate and technical documentation related to the building.
3. If the status of land ownership is not known, individuals can and should refer the question to the relevant local Land Department.

Authorization for edification: YXS

The Department of Communal Constructions, otherwise known by its Russian abbreviation UKS (Управление коммунального строительства УКС UKS), is the responsible government liaison office for management of multistoried apartment buildings. Construction works and relevant housing, land, and property issues should be referred to this body at the State level.

If implementing partners are engaging in projects on multistoried buildings, they should contact the focal point at the Department of Communal Constructions as they are the relevant counterpart for repairs:

Department of capital construction (UKS) Donetsk Address: 84121 Sloviansk, Rosy Luxemburg Str. 44 (Donetsk Regional Coverage) E-mail: dkbud.oda@ukr.net Head of the department: Yuriy 050 640 44 99	Department of capital construction (UKS) Luhansk Address: 93400 Severodonetsk Mzhk Mriya 2 (Luhansk Regional Coverage) E-mail: ukb_log@ukr.net Head of the department: Nataliya Klimova
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Initiatives in place to address Housing, Land and Property Challenges

The Housing, Land, and Property Technical Working Group was established in 2015 to join protection, shelter, and government stakeholders to address access to property rights, documentation, mortgage challenges, and other questions that have arisen during the prevailing conflict. Chaired by the Norwegian Refugee Council, the technical working group has been supported by the Ukraine Protection and Shelter Clusters in compiling cases of housing, land, and property challenges through gathering stakeholders to form a community of practice for relevant decision-making on the issue. The group ensures that these HLP issues are factored into humanitarian shelter interventions, securing basic security of tenure for privately-owned households.

The first full compilation of the issue of HLP challenges in Ukraine was published in 2016 in English, Ukraine, and Russian and can be found at the following [link](#).

More information on the Technical Working group can be found at the following [web page](#)

Prior to the crisis, the Government of Ukraine had enacted a number of resolutions aimed at addressing the issue of inadequate housing in the country. A detailed review of these challenges and the draft legislation and programs in place prior to the crisis can be obtained by reading the [report](#) of the United Nations Economic Commission for Europe and the Ukrainian Ministry of Regional Development in both English and Russian versions. More detailed investigation is required in order to follow up on the success of these programs and plans given the humanitarian crisis in Ukraine.

Annex VI Vulnerability Criteria and Protection Mainstreaming

Vulnerability Determination Adapted from Ukraine Protection Cluster Vulnerability Factsheet

The Ukraine Protection Cluster has issued a vulnerability [factsheet](#) to explain how to measure vulnerabilities when targeting beneficiaries in programming. What follows is an adaption of this vulnerability matrix and items to consider when making the final decision on whether to implement a closed or open design methodology for repairs:

Personal	Location and type of household	Socio-economic factors	Documentation
- Household composition - Newly disabled breadwinner - Elderly - Children - Special needs of family members	- NGCA - Along the contact line - Type of accommodation	- Level of poverty - Loss of livelihoods - Assets - Seasonality - Vulnerability - Access to functioning markets	- Registration - Documentation for building and repairs - Documentation for land and property - Documentation for services - Risk of eviction

Category	Vulnerability items to consider in beneficiary targeting
Displaced persons	• Resources: savings, assets, or even possessions (so-called dead capital) • Access to income • Access to any form of assistance • Access to documentation or registration • Registration status • Requirement of medical or institutional care • Exposure to traumatic events or human rights violations • Risk of eviction
Persons living along the contact line)	• Access to humanitarian assistance • Exposure to traumatic events including shelling • Risk that further harm could be done if not assessing all risks in current environment • Gender and age (different risks exist for specific groups in contact line communities) • Residing in institutions (disaggregated by age and situation: children, older persons, disabled)
People in NGCA areas	• Risk of additional economic hardship (do they have access to farmland, have they lost a job/source of income?) • Access to humanitarian assistance • Level of isolation of village • Level of familial ties – have family members been detained or missing

	• Residing in institutions and have been cut off from services and staff payments • Gender and age • Issues with documentation for housing, land, and property • Risk of eviction
Women and girls	• Gender-related risks- trafficking, harmful survival mechanisms such as survival sex • Single head of families • Widows, particularly those who have lost husbands due to death during conflict • Unaccompanied girls • Women who are survivors of violence • Pregnant and lactating women
People with socio-economic hardship	• Working age unemployed people with 0-2 children receiving neither benefits nor humanitarian aid • Main breadwinner killed, injured, or disabled • Livelihoods suffered: farmland impacted with explosive remnants of war (ERW), closure or suspension of operations for factory workers • Persons living in sub-standard accommodation which could trigger displacement and other risks • Role of gender in their hardships
Persons with chronic illness and serious medical conditions (including mental health issues)	• Whether continuous access to medication exists (especially for chronically ill persons in NGCA) • Access to state support (whether they have medication free of charge) • Whether the individual requires targeted assistance for survival • Whether specific diet is required for condition and whether they are able to practice that diet given circumstances of crisis • Gender's role in access to medication and support
Members of minority groups	• Access to documents or registration • Whether the individual has been refused access to services due to his/her minority status • Whether person has been treated by untreatable medical condition (TB, HIV) • Whether gender plays a role in deepening their exposure to discrimination
Persons with disabilities or injuries	• Exposure to discrimination • Whether disability is linked to injuries caused by conflict • Whether disability/injury impacts daily life and independent movements • Access to assistance to help disabled/injured person with daily aspects of life • Access to special services (medical, rehabilitation, etc.)

	• Whether person is main breadwinner and subsequent impact on household • If injured person is untreated, could injury lead to disability? • Impact of gender on access to services or movement
Children	• Unaccompanied minors, orphans, and children separated from parents • Children in state care institutions (particularly in NGCA) • Risk of child abandonment or institutionalization (could be in case of large families, poor families, children with disabilities, and new-borns) • Students from NGCA having moved to GCA to study (particularly those between 16-18 years of age) • Displaced children who do not qualify to register as IDPs because they are not with their legal guardians • Adolescents at risk of trafficking, recruitment, or associations with armed groups due to socio-economic hardship or family situation • Children with disabilities • Children living in crowded spaces (collective centres, host families) may be more at risk of domestic violence
Older Persons	• Access to support to assist with daily life • Access to pension entitlements especially for those residing in NGCA • Existence of a medical condition that may require additional support • Whether person is responsible for dependents (minor children or adult dependents with disabilities/serious medical condition) • Role of gender on impacting their activities, participation, and access to services

GBV Mainstreaming

Gender-based violence is a phenomenon that has increased given the humanitarian crisis in Ukraine. Overcrowding conditions at household level of shared accommodation and institutions increase the risk of such phenomenon. Additionally, domestic abuse has risen as soldiers struggle with the trauma of exposure to war through psychological illnesses such as PTSD (Post-traumatic stress disorder)

The 2015 [Guidelines for Integrating Gender-based Violence Interventions in Humanitarian Action: Promoting Resilience, and Aiding Recovery](#) issued by the Global Protection Cluster provide relevant recommendations on how Shelter Actors can seek to include GBV considerations in Shelter design and programming:

1. Involve women and other at-risk groups as staff and leaders in the design and implementation of SS&R programming
2. Prioritize GBV risk reduction in allocation of shelter materials and shelter construction.
3. Ensure equal and impartial distribution of SS&R-related non-food items (NFIs).

Annex VII Disability mainstreaming

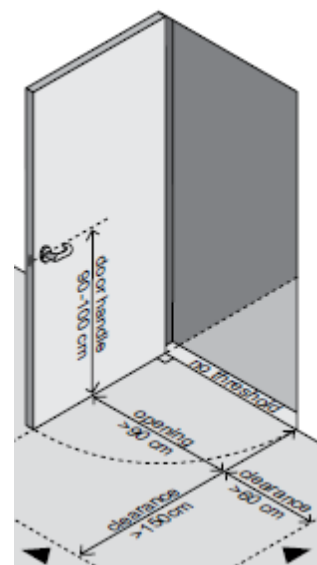
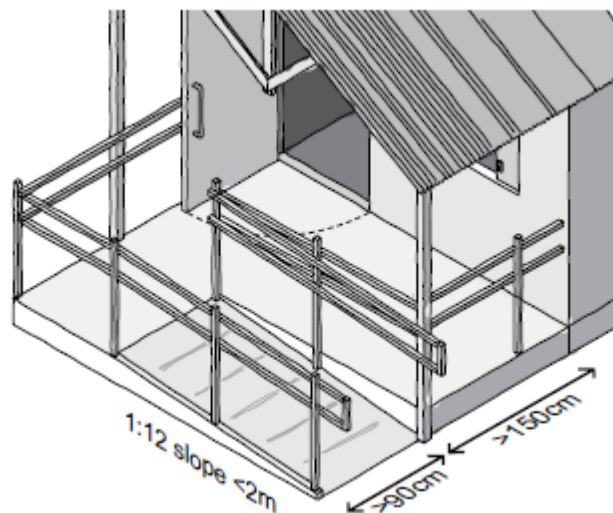
Due to injuries or disabilities sustained during the conflict or to disability in general, houses accommodating individuals impacted by crisis will have to be supported with disability-appropriate infrastructure. The Ageing and Disability Technical Working Group chaired by HelpAge International is further assessing disability needs within crisis-impacted houses in Ukraine and will provide further guidance in 2016. The annex is an initial review of required considerations according to the context, region, and design when mainstreaming disability into shelter repairs and reconstruction.

The *Minimum Standards for Age and Disability Inclusion in Humanitarian Action* recommends that Shelter Actors budget 3-8 % per building for disability mainstreaming in their interventions.

The Global Shelter Cluster has provided guidance for private accommodations in its publication *All Under Roof*, summarized below:

Entrances and Openings:

1. Ramps- Ramps to entrances ways should have a maximum 1:10 or 1:12 slope and a minimum 90 cm width (private household, while public buildings should have width of 150 cm) with a 50/19 cm curb and a non-slip surface.
2. Handrails should be added to the ramps to improve access and provide support and safety for persons with limited mobility and visual impairment.
3. A shaded porch can be included into the design which should be at least 150 cm wide, so that a person using a wheel chair can comfortably open and close the door. Seats can be adding to this porch to facilitate resting space.
4. Entrances to households should be absent of any barriers.
5. Windows and doors should be light and easy to open and close with accessible handles. The handles should be adapted according to the type of disability the house seeks to accommodate.



Lighting and Electricity

1. Colour Contrasting- It is recommended to use non-reflective materials and contrasting colours at house entrances in order to make entrance and exit of shelters easier for those with visual impairments.
2. Households should be equipped in such a way that light switches, appliance switches, and electrical outlets are easily reachable in an easy-to-use manner for those who have physical impairments.

Interior

1. Adequate space should be provided to enable those with wheelchairs to easily navigate through corridors and through kitchen, bath tub, and toilet facilities.
2. Work areas and tables are recommended to be at an appropriate height and width to accommodate wheelchairs.
3. For the interior of households, persons with disabilities can be assisted with special disability furniture such as bed frames and mattresses depending on the nature of their disability.
4. Winterization programming can mainstream disability targeting through helping households in maintenance and in preparation of insulation materials.

Adaptation of existing structures

Homes or collective centres may need to be adapted to accommodate disabled individuals.

1. Barriers should be reduced.
2. Hazardous areas which are unable to be minimized should be clearly marked with warning signs in order to prevent handicapped persons from injuring themselves.
3. Keep a stockpile of materials to create partitioned areas, so that disabled persons' privacy can be protected if they are unable to access other areas of the centre to change.

For additional information on this please see the [guidelines](#) for *All Under one Roof* and the *Minimum Standards for Age and Disability Inclusion in Humanitarian Action* at the following [link](#).