redr uk

people and skills for disaster relief

Photo by Kuzma Kolesnyk, Dniepro City. August 2022 for RedR UK

LEARNING NEEDS ASSESSMENT

UKRAINE CRISIS: INFRASTRUCTURE DAMAGE

Kate Denman

May 2023

Contents

Report reviewers and contributors: Noorullah Kuchai, Katie Bitten, Kuzma Kolesnyk, Alexander Besaga

List of Tables

List of Figures

List of Acronyms

Building Information Modelling	BIM
Class of consequence	CC
Computer-aided design	CAD
Computer Aided Engineering	CAE
Civil Society Organisations	CSO
Internally displaced persons	IDPs
Learning Needs Assessment	LNA
Prevention of Sexual Exploitation and Abuse	PSEA
Trainer of Trainers	ToT
Water Sanitation and Hygiene	WASH

Executive Summary

In April 2022, RedR UK conducted a rapid Learning Needs Assessment (LNA) to identify capacity building needs of those providing humanitarian assistance to people inside and outside Ukraine, following the full-scale invasion by the Russian Federation. Following the LNA, an extensive learning programme was offered. In December 2022, an updated LNA was launched and RedR UK further refined their offer to support the changing learning needs of responders in Ukraine.

In 2023, RedR UK is utilising its role as a bridge between the engineering and humanitarian sectors to offer a more specialised learning programme in Ukraine, in addition to its ongoing wider capacity building programme. This learning programme will specifically support effective and resilient response and reconstruction, which includes assessing buildings for safe entry, evaluating their damages, and repairing or safely demolishing them where appropriate. For this technical learning programme, RedR UK is working in collaboration with Ramboll UK, with funding from the Ramboll Foundation. This (May 2023) LNA has been carried out to inform the adaptation and development of a training programme to this effect, and to define which topics and areas to prioritise.

This LNA was designed to:

- Assess current capacity gaps and learning needs amongst engineers and other technical specialists responding to the crisis in Ukraine.
- Assess capacity strengths amongst engineers and other technical specialists involved in response and reconstruction efforts and recommend how humanitarian partners can best utilise these.
- Support revision or development of a learning programme on structural detailing and blast-induced damage assessments, for engineers and technical specialists in Ukraine.
- Enable RedR UK to respond to the needs of the response in ways that are most appropriate and relevant.

This LNA report focuses its analysis on the primary data collected through an online survey for which RedR UK received 135 completed responses. This is supplemented by desktop research carried out concurrently by RedR UK and its associates in Ukraine, to assess the current state of building damage, evaluate the existing building codes and standards, and analyse prevailing practices related to assessments and repair in Ukraine. Whilst the LNA refers and summarises this research, a separate report is available for the RedR UK technical desk review.

Summary of Findings

The technical capacity and confidence of the respondents was relatively low in most of the areas listed in the survey. Respondents with more technical experience (determined by years of service or speciality) had higher rates of knowledge and confidence overall, which is as expected. Women's confidence when self-assessing was slightly lower overall. The top three areas overall that respondents indicated they had the highest capacity in were:

1. Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)
2. Construction quality assurance and quality control
3. Non-structural repairs of buildings

The most popular tools respondents were using in their roles were reasonably low-tech and readily available: measuring tape and ruler; conducting visual inspections only, and cameras. The biggest challenges that respondents faced in the response could be categorised into themes and are listed below in order or frequency of reported challenge:

1. Security /instability/access challenges
2. Insufficient funding / inflation and economic challenges
3. Lack of specialists/skilled personnel
4. Lack of tools/equipment/data
5. Lack of or inadequate shelters and challenges assessing shelters
6. Inadequate legislation, challenges with local authorities

In regards to what respondents most wanted learning or support in, there were a wide range of needs. Overall, the area which was selected most frequently as the first priority was that of *Rapid damage assessments and classifications of buildings*, followed by *Blast effect on structures* and *Load calculations and computer modelling***.** There was a slight difference between genders, with *Preparing technical document*s and *Construction quality assurance and quality control* within the top three priorities for women. The data from respondents with more technical experience were comparable to the overall findings.

The non-technical areas which respondents felt there was a strong learning need for were: *Project management, Coordination* and *Monitoring and evaluation*. Those working in the private sector also highlighted protection and humanitarian principles as additional learning needs.

The learning preferences were mainly consistent between various demographic groups with the majority requesting live online interactive learning for no more than five hours per week.

Summary of Recommendations

It is recommended that RedR UK develop a learning programme with the following priority areas:

1. Building and shelter construction/reconstruction
2. Rapid damage assessments and classifications of buildings
3. Preparing technical documents (e.g., scope of work, bill of quantity, scoring criteria)
4. Blast effect on structures.
5. Construction quality assurance and quality control

These should be complemented with the following non-technical areas, ideally using case studies and context from engineering and shelter perspectives:

- Project management

- Coordination (with the international relief system)
- Monitoring and evaluation

Where possible the courses should integrate cross cutting themes which have appeared as challenges, such as legislation, environmental impact along with gender and inclusion mainstreaming. These are recommended to be delivered as online live interactive sessions of between two to two and half hours each. They should also be supplemented by knowledge products accessible outside of the training, depending on the subject these could be short, animated videos, resource lists or short toolkits to guide the implementation of the learning.

RedR UK will need to continue to expand its network within the engineering sphere in Ukraine and consider how best to communicate the learning programme to the target audience. RedR UK's continuing commitment to localisation and decolonisation should continuously be considered and, where possible, working with national trainers/experts and partnering with local organisations and institutions is highly recommended.

It is also recommended that RedR UK continue to learn and adapt in this area as further needs, or more nuanced needs, are discovered through careful monitoring and continued investigation.

Photo by: Kuzma Kolesnyk taken in Kyiv in October 2022 for RedR UK

Introduction

Background and Purpose

Russia launched a full-scale invasion of Ukraine on 24 February 2022, having a devastating impact on its people. It is estimated that 5.4 million people are internally displaced (as of January 2023) within Ukraine, and a further 8.2 million refugees have been recorded across Europe (May 2023)[1]. The offensive has damaged billions of pounds worth of infrastructure and left many people living in unsafe buildings and inappropriate shelters.

As noted by the Kyiv School of Economics, as of December 2022; *"the total amount of documented damage to Ukraine's infrastructure due to the full-scale invasion launched by Russia on February 24, 2022, is estimated at $137.8 billion (at replacement cost)."* [2] This will sadly only continue to grow.

In the aftermath of disasters, armed conflicts, or other emergencies, the evaluation of building damage plays a vital role in determining the safety and habitability of structures. Repair or reconstruction of safe housing can have a huge impact on the protection and wellbeing of disaster-affected communities and provide dignified and sustainable shelter. Effective building assessments, repair and reconstruction carried out safely by those with the specialist technical expertise can also mean less disruption to critical infrastructure such as healthcare, education, and energy.[3]

Building damage assessment encompasses a comprehensive examination of various elements, including the stability of foundations, load-bearing structures, walls, roofs, electrical and

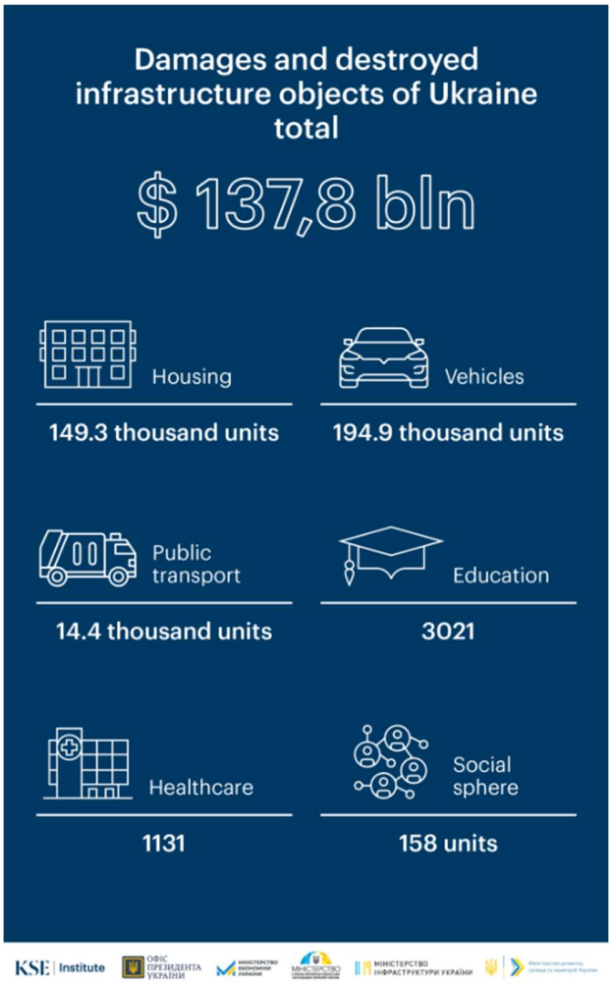


Figure 1 Damages and destroyed infrastructure in Ukraine since the invasion. [2]

[1] UN OCHA Ukraine Data Explorer, visited 14.40 GMT 25 November 2022.

[2] Kyiv School of Economics, January 2023, https://kse.ua/about-the-school/news/the-total-amount-of-damage-caused-to-ukraine-s-infrastructure-due-to-the-war-has-increased-to-almost-138-billion/

[3] A. F. El-Shamy, H. S. Abdel Gawwad, and S. Z. Ahmed, "Evaluation of Building Damage and Safety Assessment after Disasters: A Review," Journal of Performance of Constructed Facilities, vol. 34, no. 4, August 2020. DOI: 10.1061/(ASCE)CF.1943-5509.0001423 & M. Maeda, "Structural Evaluation of Damaged Buildings in Armed Conflicts," Structural Engineering International, vol. 25, no. 3, August 2015. DOI: 10.2749/101686615X14284983605818.

plumbing systems, and the overall safety of the building. This assessment facilitates informed decision-making for humanitarian aid organizations, local authorities, and other stakeholders, enabling them to allocate resources effectively and prioritize recovery efforts.[4]

Conducting these assessments, evaluations and repairs are specialist skills – skills often in high demand when disasters strike. Utilising these skills when a disaster is ongoing, when needs and vulnerabilities are high, is even more challenging. RedR UK plans to utilise its role as bridge between engineering and humanitarian sectors to support effective and resilient response in the Ukraine context, including assessing buildings for safe entry, evaluating their damages, repair, and safe demolition. RedR UK works in collaboration with Ramboll UK, with funding from the Ramboll Foundation, for this work.

RedR UK intends to draw from experience in supporting engineers in Iraq, Syria, and Türkiye, and offer a Structural Detailing and Blast-induced Damage Assessment learning programme for engineers and technical specialists in Ukraine, to support the ongoing repair and reconstruction efforts. The training is not intended to qualify participants as structural engineers, nor teach participants how to construct blast-proof buildings, as this is outside RedR UK's scope and requires a more in-depth and lengthy training. The learning programme RedR UK intends to deliver will be in line with humanitarian needs, realistic to the context and considerate to the most urgent needs.

RedR UK has been supporting the wider humanitarian response in Ukraine since February 2022, training 1000s of participants on topics such as camp coordination and camp management, inclusive humanitarian programming, and protection from sexual exploitation and abuse (PSEA). As part of this wider response, RedR UK has already released two learning needs assessments (LNA) for Ukraine: in April 2022 a rapid LNA was completed, and in December 2022 an update was published.[5] The distinction between this LNA is the ones RedR UK has previously published, is that it is specifically aimed at assessing the needs of engineers and other technical specialists.

This LNA has been carried out to inform the adaptation and development of a training programme, and to define which topics and areas to prioritise.

The LNA was designed to:

- Assess current capacity gaps and learning needs amongst engineers responding to the on-going reconstruction efforts in Ukraine.
- Assess capacity strengths amongst engineers involved in reconstruction efforts and recommend how humanitarian partners can best utilise these.

[4] Federal Emergency Management Agency (FEMA). (2002). Building Performance Assessment: Hurricane Katrina in the Gulf Coast. Retrieved from https://www.fema.gov/media-library-data/20130726-1836-25045-8876/fema549_ch1.pdf

[5] Both previous LNA's are available here: https://www.redr.org.uk/Training-Learning/Ukraine-LNA

- Support revision or development of modules for the structural detailing and blast-induced damage assessment training course for engineers in Ukraine.
- Enable RedR UK to respond to the needs of the response in ways that are most appropriate and relevant.

The LNA will be supplemented by a desk review and research, which is being conducted by RedR UK and Ramboll UK concurrently. The primary objective of this desk review was to assess the current state of building damage in Ukraine, evaluate the existing building codes and standards, analyse prevailing practices related to assessments and repair, and gain insights into the types of buildings and damage prevalent in the country. The aim was to gather valuable information to inform the development of a technical training course.

Methodology

The desk top review was conducted by RedR UK and two partner Ukrainian engineers, and employed a systematic research methodology. Multiple sources were consulted, including academic literature, reports from international organizations, government publications, and national codes and standards. The information collected was analysed, to better understand the landscape of infrastructure in Ukraine.

To collect the primary data for this LNA an online survey was created by RedR UK with input from Ramboll UK engineering specialists and the two Ukrainian engineers mentioned above. This was widely disseminated through the RedR UK networks such as on social media platforms (LinkedIn), via emails directly to engineers and technical specialists in Ukraine, and members of the Ukraine Shelter Cluster. The survey was open for nearly three weeks from 27th April 2023 until 10th May 2023 and was provided in English and Ukrainian. A total of received 258 responses were received, however, 123 respondents didn't complete the survey beyond the demographic questions (it is expected that this is due to a realisation that the survey was designed for technical specialists only). For this reason, the data was cleaned, and 135 respondents were considered to have completed the survey and are relevant to this LNA. Survey Monkey and excel were used to analyse data presented in this report.

Survey Respondent Profiles

From the 135 respondents analysed in this report, 121 reported that they were working on or supporting the ongoing crisis in Ukraine; the remaining have worked in the Ukraine response or are engineers with relevant insight. In addition, 113 are currently based in Ukraine. The table below shows a complete breakdown.

COUNTRY IN WHICH RESPONDENT IS BASED	NO. OF RESPONDENTS
Ukraine	113
Germany	3
Poland	3
United Kingdom	3
Afghanistan, Denmark, Ethiopia, India, Indonesia, Kenya, Nigeria, Sierra Leone, South Sudan, Syria, Uganda, United States, Yemen	1 per country

Table 1: List of countries where respondents are based.

GENDER IDENTITY	PERCENTAGE	NO. OF RESPONDENTS
Man	64%	86
Woman	35%	47
Non-binary	0.7%	1
Prefer not to say	0.7%	1

Table 2 Gender breakdown of respondents

In total, 64% of the respondents identified as men, and 35% women. Five people (3.7%) identified as having a disability and 5 people (3.7%) selected 'prefer not to say' regarding disability. Whilst it is hoped that there would be a more equal proportion of genders, as well as 15%[6] representation of people with a disability, it is typical of engineering to be weighted towards men and have less representation of people with disabilities. Data was disaggregated for later questions to ensure any differences in needs or priorities between different identities were accounted for.

A considerable proportion of respondents (31%) did not feel their role fitted within the given categories within the survey and instead selected 'other'.

These respondents' roles ranged from university lecturers to lawyers (a complete lists can be found in Annex 2).[7]

[6] This is based on an estimated 15% of the population globally living with a disability (Disability Inclusion, World Bank, April 2023). To have a representative proportion of the population within a survey a good benchmark is 15%.

[7] It is worth noting that many engineers have left Ukraine which has meant many people who are not qualified/trained engineers filling gaps and therefore involved in assessments/repair.

The table below shows the respondents roles by gender within the optional categories. It is worth noting that the proportion of structural engineers, other engineers, shelter practitioners and architects is similar between women and men. The difference is noted in urban planners, of which there are no men represented and construction workers of which there are no women represented.

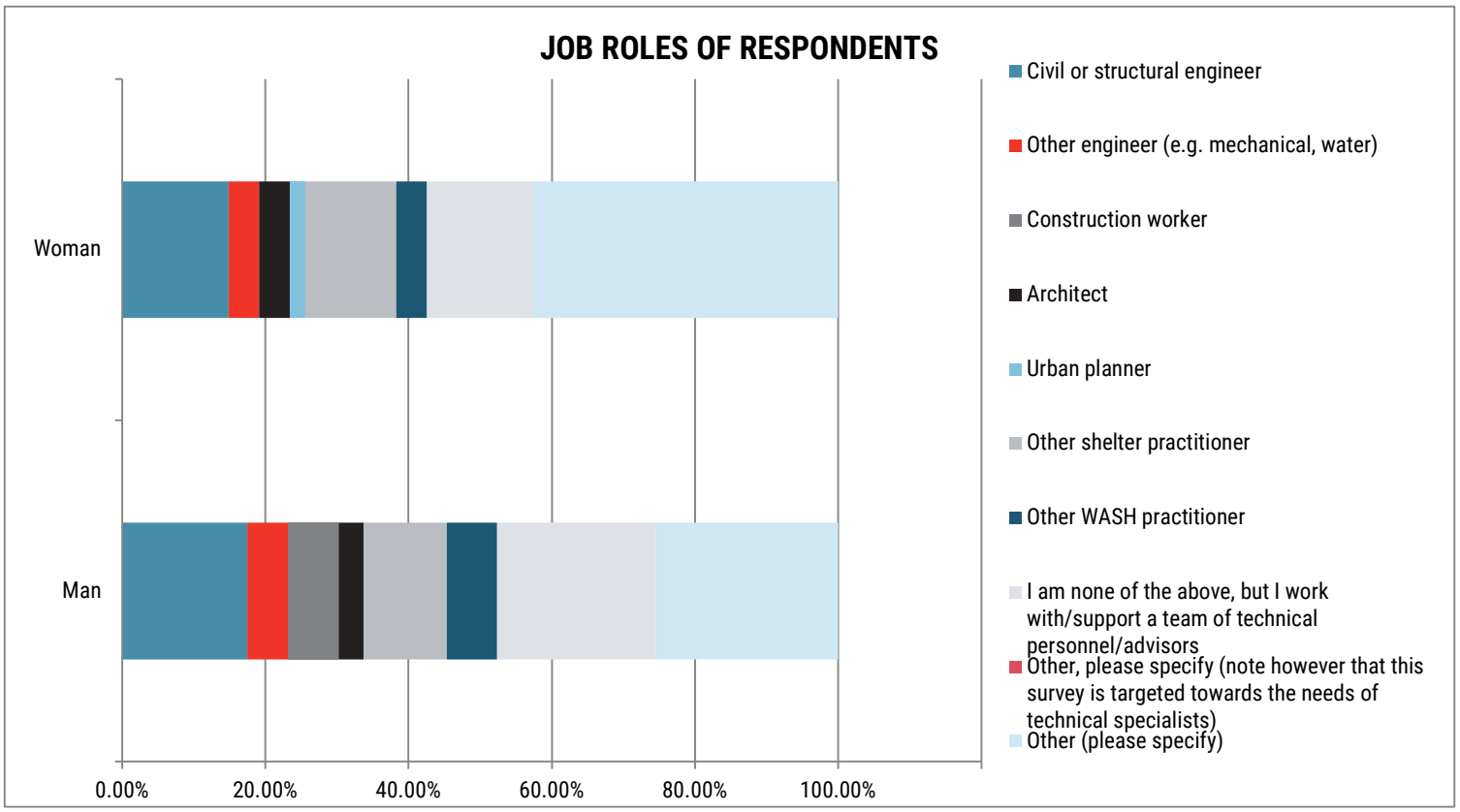


Figure 2 Job roles of respondents by gender

Most respondents worked with international or national NGOs (67% in total), with 30% of other respondents working in academia, private companies, the UN, Community-based Organisations (CBOs) or working as individual entrepreneurs/ contractors. One person worked in local government, 1 in national government and 1 for an organisation for people with disabilities (see table 3 below for more details). 45% of respondents had over ten years professional experience, 21% had four to ten years, 14% had zero to four years and 18% had no technical experience. Nearly half of respondents (47%) had only worked in the humanitarian sector since the start of the Russian invasion, whilst 24% had worked in the humanitarian sector for over 5 years.

Respondents' involvement in damage assessments, building repairs and/or demolition since the beginning of the invasion varied, with 62% having no involvement and 39% (51 people) having worked in some form in this area. This ranged from people who work in the Shelter sector and made assessments of households, and hospitals that were damaged to Water Sanitation and Hygiene (WASH) officers and people involved in building repairs and construction and improvement of living conditions for IDPs.

As with gender, the level of experience and organisation type of respondents were disaggregated during the analysis, to ensure any differences in needs or priorities amongst different audiences were accounted for. Wherever significant differences arose across different groups, this is outlined in this LNA. Such also helps RedR UK define its audience for this learning programme.

PLACE OF WORK	PERCENTAGE	NO. OF RESPONDENTS
International NGO	47%	64
National or regional-level NGO	20%	27
Academic Institution	8%	11
Private Company	7%	9
United Nations	4%	6
Individual entrepreneurs/ contractor	4%	5
Community Based Organisation	3%	4
International Red Cross (IFRC or ICRC)	1%	2
Local Government	1%	1
National Government	1%	1
Organisation for people with disabilities	1%	1
Other (answers included Ukraine Red Cross, working with individual volunteers, retired and volunteer)	3%	4

Table 3 Respondents places of work

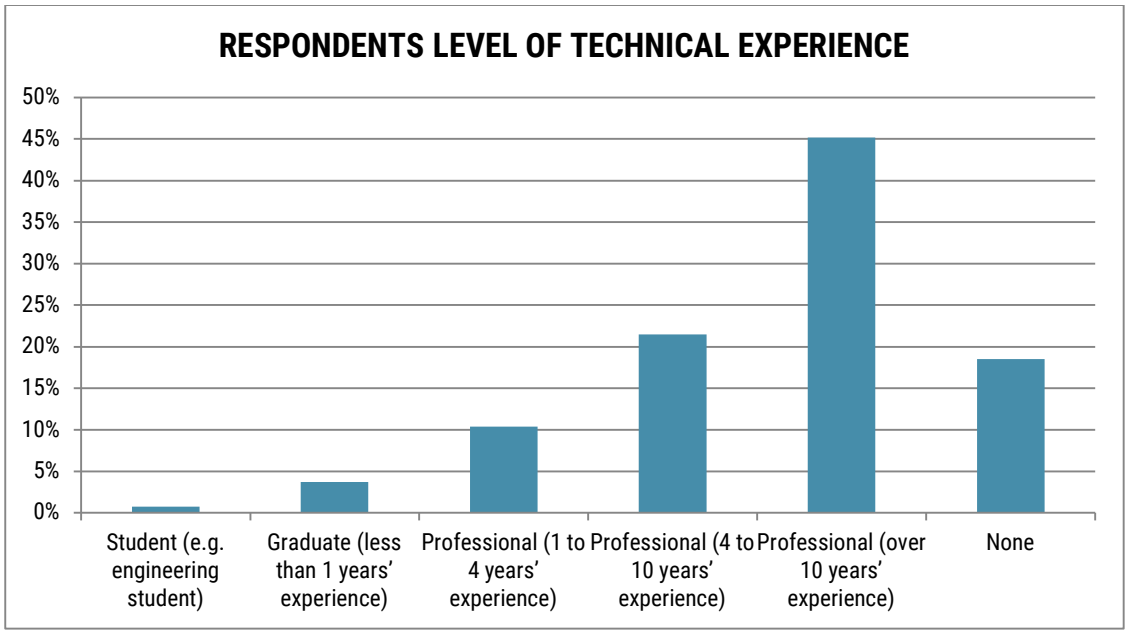


Figure 3 Respondents level of technical experience

The classes of consequence (CC) are an engineering categorisation regarding building type, occupancy and risk of failure and impact. It is based on the European Code and presents the relation between the reliability index and the structure risk assessment, which is mainly a function of the consequence or impact on people, economics, or the social or surrounding environment in the case of a structure failure[8]. Respondents experience in the different classes is important to understand, as it indicates the level of experience in different building types. As demonstrated in the figure below, only 17% (23 respondents) have experience with CC3, although it is worth noting that in Ukraine it is challenging to obtain a CC3 class license. It is reported to be common that customers, even state structures, try not to fall into CC3 through various loopholes, for example, underestimating the number of people staying at the facility, underestimating economic losses, etc.

The consequence of this is that the need for such a license is quite small, which may go some way to explain why the number of certified specialists is also small. More than 50% did not have a CC in any form (and opted for ''not applicable to me'). Given the target group of the survey this might also demonstrate the lack of highly skilled engineers working in Ukraine and further demonstrate the need for this learning programme. The findings were disaggregated to analyse if there was any significant difference between the learning needs of those who are qualified as CC2 and CC3 and the rest of the respondents. Where differences were found it is highlighted in the narrative of the report. With that in mind it's also interesting to note that only 51% of respondents with CC2 and CC3 currently in Ukraine (26 peoples) have been involved in damage assessments, building repairs and/or demolition since the start of the invasion.

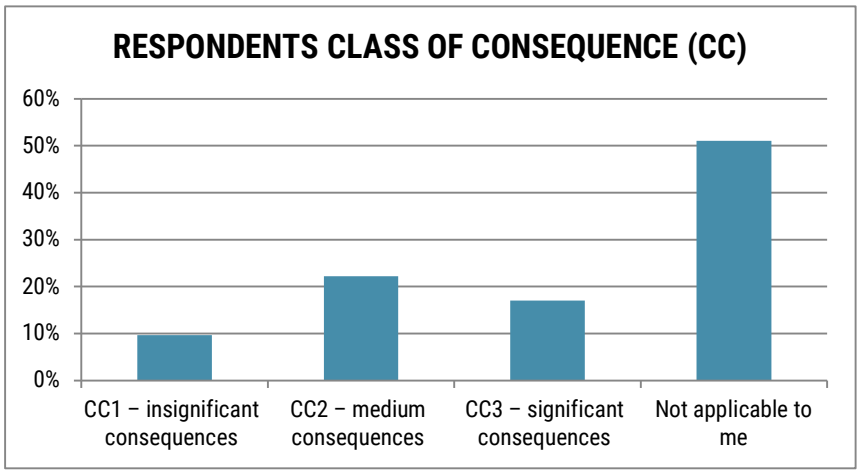


Figure 4 Respondents class of consequence

[8] As described in: https://www.sciencedirect.com/topics/engineering/consequence-class

Limitations of Primary Data

The sample size of the online survey was limited; from the 132 included in the analysis, 111 are based in Ukraine and currently responding to the crisis, and of those 69 are working in one of the key roles the survey had available as a drop-down menu (such as engineer, construction worker, architect). Other positions that people self-selected were noted as relevant too, however, such as shelter project managers/coordinators etc. Whilst the number of relevant respondents is not expansive, it is considered sufficient to assess the main gaps for learning.

Ideally the survey would have had 50% representation of women. Whilst this was not achieved, a significant proportion (35%) were women. Five respondents identified as having a disability, representing a significantly low proportion and the range of disabilities unknown. To ensure different views from people with disabilities and women are represented, all data has been disaggregated by gender and disability and where there is significant divergence between genders, this has been noted in the analysis. No information was collected regarding ethnicities and so it is not possible to assess if the survey received a range of perspectives, for example from the Roma community or LGBTIQ+[9], who have long been marginalised within Ukraine[10].

The survey was available in English and Ukrainian. Whilst these are spoken by the majority (67% of the population speak Ukrainian and 30% speak Russian as their first language), other minority languages exist in the country including Romanian (0.87%) Crimean Tatar (0.5%), Bulgarian (0.43%), and Hungarian (0.43%)[11]. Ukrainian or Russian are the languages used for tertiary level education in Ukraine and given the target audience of skilled professionals, it is highly likely that the respondents will speak Ukraine and/or English as well as their first language. Further, whilst the location of respondents was collected in the survey, there is no determination as to whether they are international or national staff/individuals, which limits RedR UK's ability to know if the findings are directly related to national capacity needs.

The survey itself was not available in any format other than online written questions. This is likely to have limited contributions from people with disabilities, however the survey could be read by a screen reader. Internet connection can be limited due to continuous power cuts in Ukraine, this may have limited some people's access to the survey. The survey was open for nearly three weeks (27th April - 10th May 2023) and relied on individuals' access to internet and phone/computer to complete the survey. It is worth noting that should a respondent experience a power cut/internet cut when they are completing the survey, data is saved, and the individual can return to complete the survey when internet returns. Finally, the survey relied on self-assessment of capacities and learning needs. Self-assessment can be subjective, where learners may over or under evaluate their own skills; this can also be influenced by culture, education, and gender.

[9] To note that one person identified as non-binary in the survey respondents

[10] The impact of the Ukraine crisis on women, girls, and marginalised groups, Action Aid, February 2023 https://actionaid.org/news/2023/impact-ukraine-crisis-women-girls-and-marginalised-groups

[11] Language data for Ukraine, Translators without boarders, https://translatorswithoutborders.org/language-data-for-ukraine

Summary of Desk Top Review

Building Damage Assessment in Ukraine

The desk review revealed a significant prevalence of building damage throughout Ukraine due the ongoing aggression by Russia. As of 7 June 2023, UNESCO has verified damage to 259 sites since the start of the invasion – 112 religious' sites, 22 museums, 93 buildings of historical and/or artistic interest, 19 monuments and 12 libraries[12]. However, the Ministry of Culture and Information Policy of Ukraine suggested that more than 1,300 cultural institutions were damaged or destroyed by May 2023. Amongst those, Civil and municipal infrastructure suffered the greatest losses in Donetsk, Kyiv, Kharkiv, Luhansk, Mykolaiv, Zaporizhzhia, Sumy, Kherson and Dniepro regions.

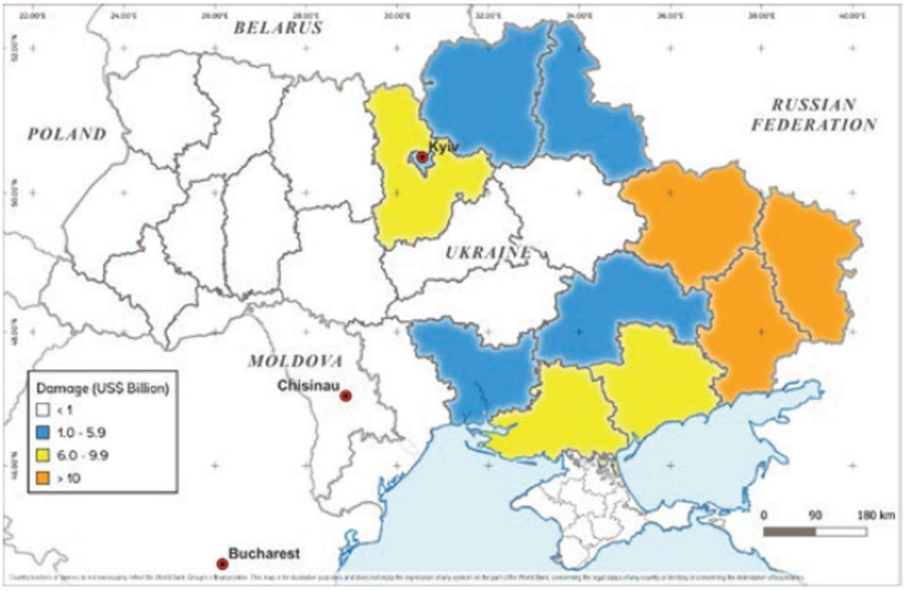


Figure 5: Extent of damage by region as of February 24, 2023. Source: Ukraine Rapid Damage Assessment and Needs Assessment Report, (World Bank, 2023)

There has also been a huge impact on residential structures. Whilst up-to-date figures are challenging to assess due to the ongoing conflict, the Kyiv School of Economics counted 149,300 buildings designated for habitation that had suffered severe damage or complete destruction by December 2022. Among the affected

[12] United Nations Educational, Scientific and Cultural Organization (UNESCO), 07 June 2023. Damaged Cultural Sites in Ukraine Verified by UNESCO. Retrieved from https://www.unesco.org/en/articles/damaged-cultural-sites-ukraine-verified-unesco

properties were 131,400 private houses, 17,500 apartment buildings, and 280 dormitories (Kyiv School of Economics, December 2022)[13]. This number will have only increased in recent months.

Similarly, The National Council for the Recovery of Ukraine from the Consequences of the War report[14], reported that the total number of destroyed or damaged housing in Jul 2022 was about 121,000 buildings, of which 107,800 are private houses; 13,100 are multi-apartment buildings; and also, about 100 dormitories. The observed types of damage encompassed a wide range of issues, such as structural failures, compromised foundations, roof damage, disruptions in electrical and plumbing systems, and wall collapses.

Building damage assessments are carried out under the supervision of Certified Assessors. According to the updated Ukrainian legislations[15] on a) architectural activities, b) Construction standards and c) Urban planning and reconstruction, any construction activity, including new construction, restoration, reconstruction, or major repairs (referred to as "Restoration" for simplicity), must commence with a technical survey of the object to determine the feasibility of its restoration. An Expert on Technical Inspection of Buildings and Structures (ETIBS) is the one to prepare estimates for these works if necessary, however due to the current situation it is not always done in practice.

Types of Buildings and Damage

The research examined the diverse types of buildings commonly found in Ukraine and the associated damages. The analysis revealed a wide array of structures, ranging from residential buildings to industrial facilities and public infrastructure. The damages observed exhibited varying degrees of severity, ranging from minor cracks and deterioration to complete structural failures. These insights provided valuable information for understanding the specific challenges faced across different sectors and guided the formulation of appropriate training content.

According to "Rapid Damage and Needs Assessment" for the period of February 2022 – February 2023; published by the World Bank[16]; damage to asset types is classified in three levels: fully destroyed, damaged, and no/minor damage. Since loss is typically measured until "normality" is restored, the calculation includes an additional 18 months following the 12 months between February 24, 2022, and February 24, 2023.

---

[13] Kyiv School of Economics, *The total amount of damage caused to Ukraine's infrastructure due to the war has increased to almost $138 billion*. https://kse.ua/about-the-school/news/the-total-amount-of-damage-caused-to-ukraine-s-infrastructure-due-to-the-war-has-increased-to-almost-138-billion/

[14] Council of Europe Development Bank. (2022, July). *Post-Assessment Document on Ukraine Recovery Strategy in Local and Regional Self-Government Areas*. Retrieved from http://www.slg-coe.org.ua/wp-content/uploads/2022/07/CEGG-PAD-on-Ukraine-Recovery-Strategy-in-LSG-area_ENG_FINAL.pdf

[15] https://www.lexology.com/library/detail.aspx?g=a1c279bc-d72e-4fa7-bd26-1c06b7b2d8bd

[16] Rapid Damage and Needs Assessment, World Bank, 2023. https://documents1.worldbank.org/curated/en/099184503212328877/pdf/P1801740d1177f03c0ab180057556615497.pdf

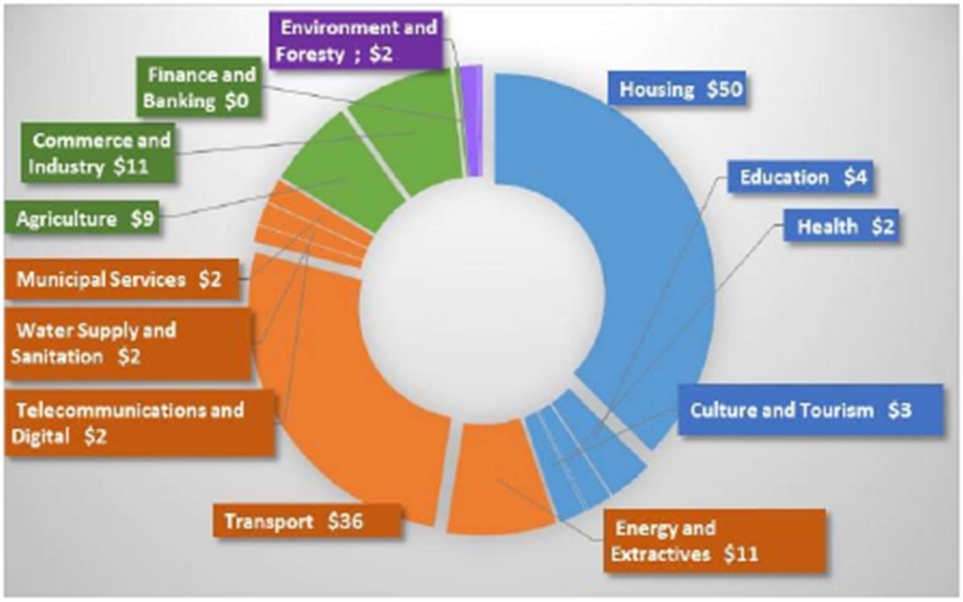


Figure 6: The total damage across sectors covered in the RDNA2 is estimated at approximately US$135 billion (World Bank, 2023)

Building Codes and Standards

A meticulous analysis of the building codes and standards applicable in Ukraine was undertaken. The review highlighted the presence of national building codes and regulations aimed at ensuring the safety and integrity of structures. However, it also identified certain gaps and inconsistencies within the existing framework, suggesting the need for periodic updates and alignment with international best practices.

Normally, the cost estimate is done in compliance with decrees approved by the Ministry for Communities, Territories and Infrastructure Development of Ukraine. Technical specifications mandatory in construction are adopted as State Construction Norms (can be compared to building codes) by the relevant ministry (and there are close 100 such norms). To summarise the codes:

- The assessment of the condition of buildings begins with a technical inspection of the building, which is regulated by Resolution of the CMU No. 257 of April 12, 2017[17].
- The technical inspection is carried out in accordance with the Guidelines for the inspection of buildings and structures to determine and assess their technical condition DSTU-H B V.1.2-18:2016.
- According to this Guideline, the examination is visual and instrumental main types of examination are visual and instrumental - it is carried out if visual is not enough.

[17] The information on codes can be obtained from the websites of the different ministries of Ukraine. Here are a few links for further information: https://dbn.co.ua/load/zakony/18, https://diam.gov.ua/normativno-pravovi-akti/derzhavni-budivelni-normi ; https://e-construction.gov.ua/laws/doc_type=2 ; http://online.budstandart.com/ua/catalog/topiccatalogua/design/09._dbn_(derzhavnii__243681.html ; https://zakon.rada.gov.ua/rada/show/v0046307-93#Text ; https://mtu.gov.ua/content/chinni-budivelni-normi.html?PrintVersion

- Also, the technical inspection gives an opportunity to understand what kind of repair is needed - restoration, reconstruction, overhaul, etc.

There are 190 state building regulations that are active in Ukraine which can be split in 5 main types:

- DBN A. Organizational and methodological standards (Includes 21 separate document with norms)
- DBN B. Town planning norms (Includes 23 separate document with norms)
- DBN V. Technical normative documents. Production technology (Includes 123 separate documents with norms)
- DBN G. Recommended norms, Manuals (Includes 9 separate document with norms)
- DBN D. Budgeting norms and rules (Includes 14 separate document with norms)

The list of norms and standards that can be taken into account in the process of damage assessment:

- DSTU-NB V.1.2-18:2016 - "Guidelines for the inspection of buildings and structures to determine and assess their technical condition."
- DBN V.1.2-14:2016 - "A system for ensuring the reliability and safety of construction objects. General principles of ensuring the reliability and structural safety of buildings and structures."
- DSTU-N V.1.2-18:2016 – "Assessment of the technical condition of steel building structures in operation."
- DSTU-B V.2.6-210:2016 -"Eurocode 8. Design of earthquake-resistant structures. Part 3. Condition assessment and rehabilitation of buildings (EN 1998-3:2005, IDT)."
- DSTU-B D.1.2-3:2016 -"The procedure for determining the cost of work on the inspection of metal structures of buildings and structures."
- During the technical inspection, it is necessary to take into account the classes of buildings (CC1, CC2, CC3), their purpose (determined according to the State Classifier of Buildings and Structures DK 018-2000).

Current Practices in Assessments and Repair

The desk review delved into the prevailing practices concerning building damage assessments and repair processes in Ukraine. It was observed that assessments were primarily conducted by various stakeholders, including engineers, architects, and government agencies. However, a lack of standardization and uniformity in assessment methodologies was evident, leading to variations in the accuracy and reliability of findings. Additionally, limited resources and capacity hindered the timely execution of repairs and retrofitting measures. Only a certified Technical Inspection Expert of the relevant category is authorized to assess the damages, due to the need, now the assessments are done by other technical people who work under a certified technical assessor. Repairs can be carried out by a builder holding a civil engineering diploma for building category CC1, and by a licensed individual (or organization) possessing the relevant license for categories SS2 and SS3. Furthermore, a significant issue lies in the scarcity of experts and licensed specialists. Training in this field, as well as the issuance of certificates and licenses, is exclusively needed.

The following specialists participate in the restoration of the building/structure:

1. Expert in technical inspection of buildings and structures (Independent expert).
2. Chief engineer of the project. (Representatives of the organization who made the project (blueprints and plans) of the building)
3. Chief architect of the project. (Representatives of the organization who made the project (blueprints and plans) of the building)
4. Calculator (the person that prepares calculations on monetary value of the planned restorations/retrofitting activities) .
5. Main contractor. (Construction company that provides the services)
6. Technical supervision of construction (representatives of the person who request).

All restoration projects - restoration, reconstruction, major repairs, except for current repairs - begin with a technical inspection of the object.

Implications for the Training Course

The findings derived from the desk review carry significant implications for the design and content of the forthcoming technical training course. The identified gaps in building codes and standards, as well as the lack of uniformity in assessment practices, underscore the importance of incorporating modules that address these issues. Furthermore, the issue of damage assessment of infrastructure is further exacerbated by the scarcity of experts and licensed specialists. Training in this field, as well as the issuance of certificates and licenses, is exclusively needed. The training course should emphasize the adoption of standardized assessment methodologies, the interpretation of building codes, and the dissemination of best practices for effective repairs and retrofitting.

Findings – Online Survey

Capacity Strengths and Challenges

Technical Capacity Strengths

Respondents were asked to assess their technical capacity in several key areas:

- Blast effect on structures
- Load calculations and computer modelling
- Rapid damage assessments and classifications of buildings
- Post-fire damage assessment
- Structural evaluations of buildings
- Non-structural repairs of buildings
- Retrofitting of buildings to enhance blast-resistance
- Structural repairs of buildings e.g. columns, beams, slabs
- Building and shelter construction/reconstruction
- Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)
- Construction quality assurance and quality control
- Debris management (Rubble removal)
- Safe demolition of damaged buildings
- Design of new buildings

The technical capacity strengths of respondents are relatively evenly spread as demonstrated in figure 6 overleaf.

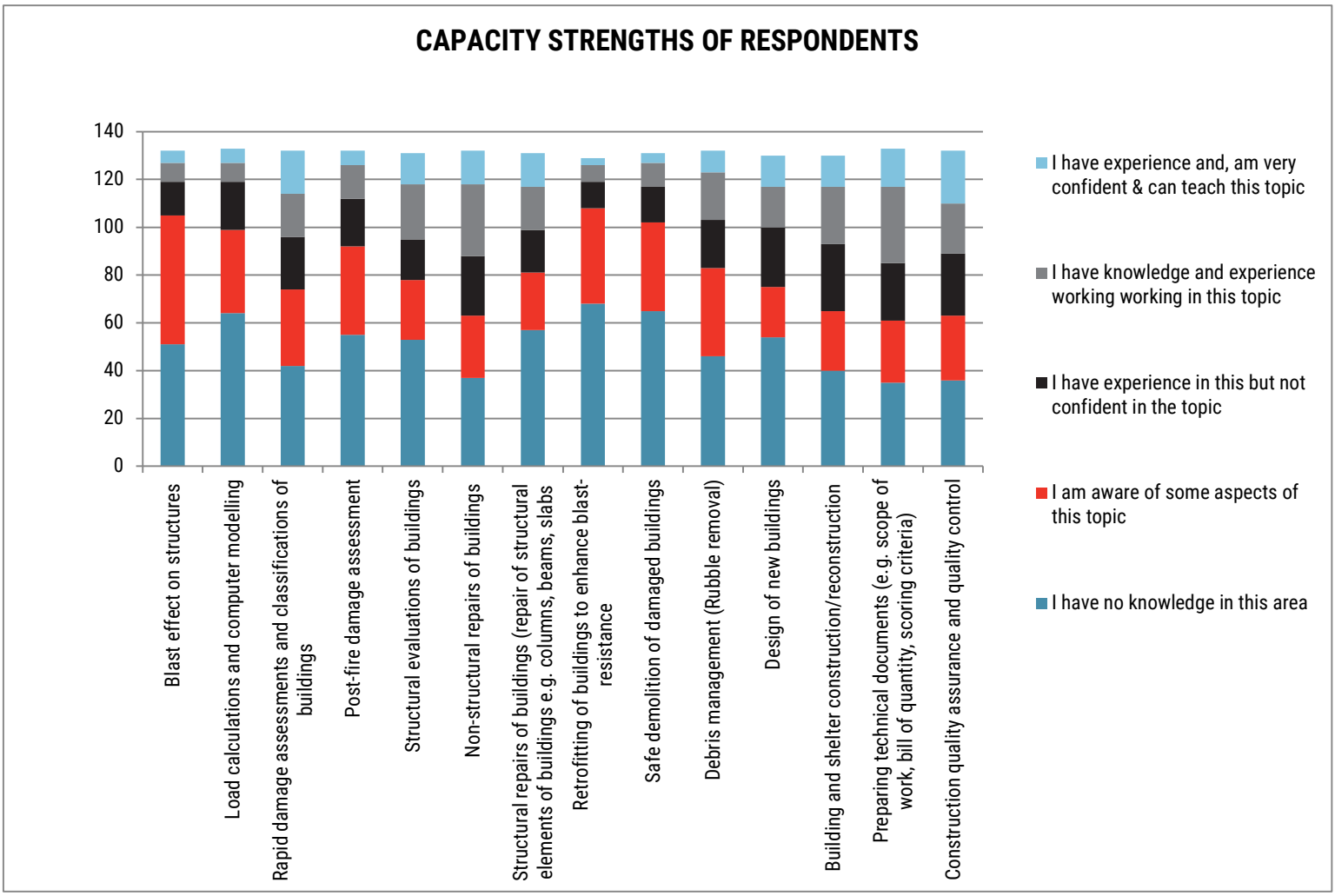


Figure 7 Self-assessment of capacity strengths of respondents

Respondents were most confident in *Construction quality assurance and quality control* (e.g., ensuring compliance with building codes and standards, conducting inspections, and implementing quality management systems, scoring criteria) with 43 respondents selecting that they were either very confident and could teach others (score 5) or have knowledge and experience in the area (score 4). Similarly, *Rapid damage assessments and classifications of buildings* also had high levels of competence, with 36 selecting scores of four or five. The third area of confidence was the *Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)* with 48 who scored this topic as 4 or 5 (although only 16 rated themselves in category 5), closely followed by *Non-structural repairs of buildings* with 44 scoring four or five. The area with the lowest confidence and capacity was *Retrofitting of buildings to enhance blast-resistance,* closely followed by *Safe demolition of damaged buildings* and *Load calculations and computer modelling.*

When disaggregated by gender, women's strongest area of capacity are those of:

- *Preparing technical documents* (13 women scored 4 or 5)
- *Non-structural repairs* (10 women scored 4 or 5).

- *Construction quality assurance and quality control* (9 women assessed as score 4 or 5)
- *Designing new buildings* (9 women assessed as score 4 or 5)

Overall women's level of confidence in each technical area was lower than men's with on average none or one woman scoring themselves as category 5 in each competency. This in part could be due to perceived level of confidence, where men are more likely to rate themselves higher when self-assessing compared to women[18]. It is also likely to be that men also have had more opportunities in a gendered society to experience and progress in the technical topics.

As expected, when data is disaggregated by CC2 and CC3, higher levels of confidence are found with 32% (14 people) scoring 5 in *Rapid damage assessments and classifications of buildings,* followed by 27% scoring 5 in *Structural evaluations of buildings* and *Construction quality assurance and quality control.*

Using a weighted average across all respondents, the topics are rated in order of competence (from highest to lowest) below:

1. Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)
2. Construction quality assurance and quality control
3. Non-structural repairs of buildings
4. Building and shelter construction/reconstruction
5. Rapid damage assessments and classifications of buildings
6. Structural evaluations of buildings
7. Design of new buildings
8. Debris management (Rubble removal)
9. Structural repairs of buildings (repair of structural elements of buildings e.g. columns, beams, slabs
10. Post-fire damage assessment
11. Blast effect on structures
12. Load calculations and computer modelling
13. Safe demolition of damaged buildings
14. Retrofitting of buildings to enhance blast-resistance

It is also important to note that a low competence level among respondents does not indicate that RedR UK should deliver a learning programme in that area. Low levels of confidence may indicate that the area is less relevant, or that it is more specialised (so only a few people need to have high competence). The learning from this question area should be used in conjunction with evidence in the learning needs to help inform RedR UK's response.

[18] The Gender Gap in Feedback and Self-Perception, Harvard business review 2016, https://hbr.org/2016/08/the-gender-gap-in-feedback-and-self-perception

Recommendation:

It is important to recognise the skilled professionals that remain in Ukraine, whilst also appreciate the limited time that highly sought-after professionals have available. It is recommended that RedR UK draw from the national skilled pool of professionals to deliver a learning programme, where possible, without placing an extra burden on them. In some cases, this may mean that international professionals will be required for certain training sessions, possibly with a national on the ground member only entering for a final question and answer session or playing a supporting role. The final decision on the balance between national and international consultants working on the programme should be decided by availability and preference of the national staff.

Tools currently used for work

Respondents were asked which tools they used in their work, and which were available to them. Figure 7 below shows that the most popular tools were measuring tape and ruler, conducting visual inspections only, and cameras. It is worth noting these are all more basic tools, likely to be also the most readily available. Other tools listed for respondents to select require more specific equipment/purchasing for engineering and construction purposes. It is not clear if respondents are not using more technical equipment because of lack of availability or lack of knowledge regarding how to use them. This should be further investigated if training and capacity building is including specific tools to avoid training on tools that are not available or that participants already know how to use effectively.

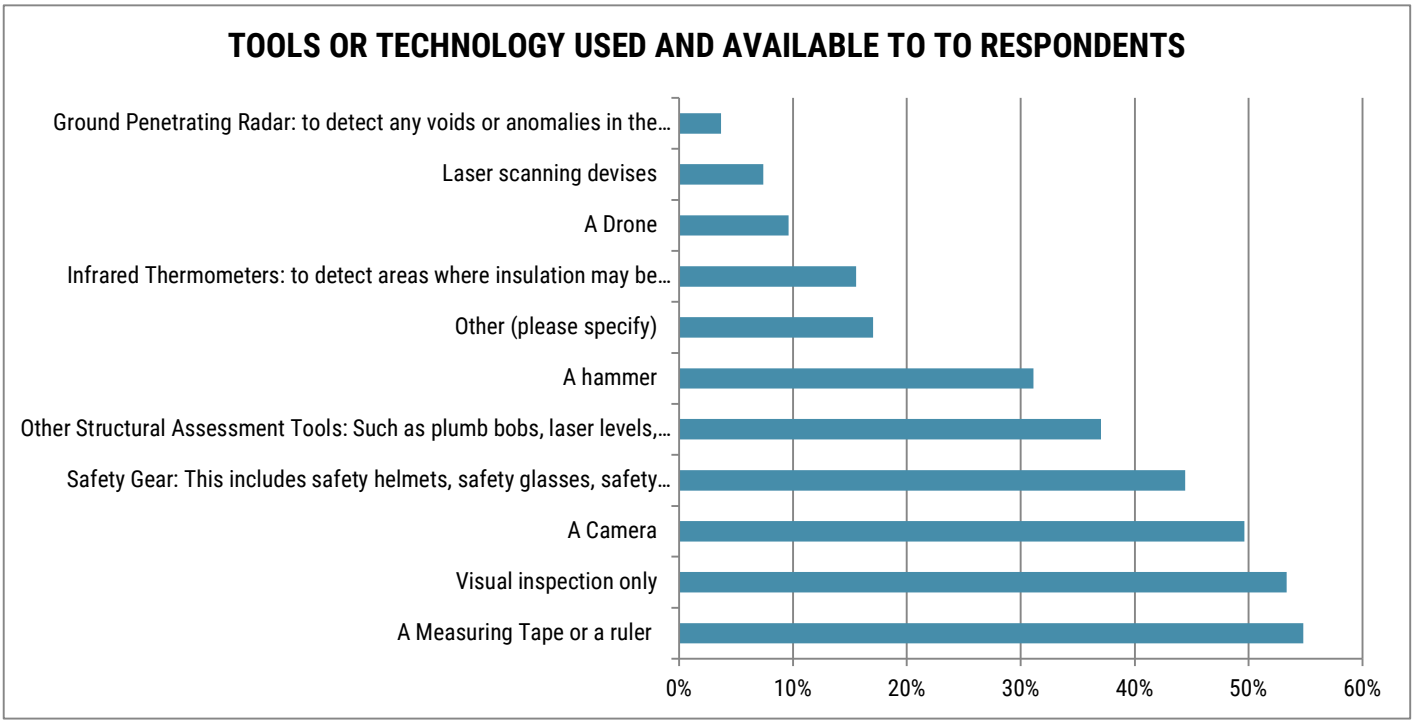


Figure 8 Tools or technology currently used by respondents

In addition to the above tools selected, some respondents also added some specific tools that were not already listed these are as follows:

- Electronic sclerometer (Concrete strength meter)); SEARCH-2.5(Concrete cover gauge); Kashkarov's hammer; Schmidt's hammer
- Tools for destructive and non-destructive testing of concrete strength
- Defect scope, press, tearing machine and many other devices depending on the need
- Non-destructive methods of controlling the strength characteristics of constructions
- Non-destructive testing devices, determination protective layer of concrete, larer levels
- Ultrasonic control tools
- Documentary analysis
- Internet - GIS products
- Deformations measurement using sensors and indicators. Deformations measurement in order to assess the stress-strain state of structures.
- Levels, theodolites
- Computers

Challenges

When respondents were asked, in open format, what their three biggest challenges were in working in Ukraine, there was a wide range of responses relating to both technical and non-technical issues. 116 individuals commented, with some people writing three challenges, and others naming one or two. Their responses have been categorised and summarised in the table below and are listed in the order of most frequently mentioned (please see annex 3 for complete lists of comments in these areas):

THEME	SUMMARY	FREQUENCY MENTIONED
Security /instability/access challenges	The majority of comments in this category related directly to the continued challenges of working and living in a war zone. The constant threat of shelling, fear, psychological trauma, and the lack of being able to predict any future. 6 comments related directly to the security situation making access for aid/data collection extremely difficult and this being the biggest challenge.	46 (mentioned in 38% of comments)
Insufficient funding / inflation and economic challenges	The majority of comments in this category related directly to the lack of sufficient funding, many went further to comment on the increase in building materials, products, housing and general inflation further exasperating the funding challenges making many projects impossible. Others commented on the low pay and lack of stable work impacting their lives. One comment touched on the need for longer term vision "*Finding a long-term perspective for people (build new or restore buildings, instead of building modular (short-term)"*	29 (mentioned in 25% of comments)

	Another comment also mentioned the specific challenges for local actors in the most volatile areas to obtain funding: *"Most of the last mile transportation to these areas are being done by 'non-traditional' volunteers, many independent some with NGOs too small to partner with the UN or big Aid… Many local organizations cannot access these sources of Aid… No one can do everything that needs to be done, there are people who do things 'best' at this point. They are and will be the innovators. The volunteers that will implement anything are in the hard-to-reach areas, they are stressed out. Reconstruction support from the safer areas to give them some 'backup' would be tremendously helpful."* Another comment is related to the paperwork required by donors and suppliers not willing to supply documents resulting in funding challenges. *"Suppliers not willing to support the purchase with the additional documents required by donors"*	
Lack of specialists/skilled personnel	A range of comments were received in this area, many were very general siting simply a "*lack of specialists"*, others were more specific "*Lack of knowledge about retrofitting damaged buildings after war bombing", "Lack of experience in designing of bomb shelters (incl. shelters integrated in new buildings), "Lack of technical inspectors*." One comment specifically pointed out the current lack of intensive training for rapid response teams to use specialised equipment. They also highlighted that this has resulted in inefficient volunteers and placing them in dangerous situations. A couple of comments recognised the reason for the lack of specialised personnel is due to loss of life and many skilled people being drafted into the army.	25 (mentioned in 22% of comments)
Lack of tools/equipment/data	Many comments in this area focused on the lack of building materials, one person mentioned delays in the supply chain, another commented on the lack of safety equipment and lack of equipment for training civil engineers. 3 people mentioned power cuts impacting their work as well as disruption of basic supplies and water shortages. More technical comments were also received regarding assessing blast damage and the need for equipment and data: "Classification of blast influence on the structures from combat projectiles. A lack of modern Computer Aided Engineering (CAE) systems for structures behaviour modelling under blast conditions. A lack of the experimental data about blast influence on the building structures etc." and "There are no clear algorithms (approved recommendations, regulatory documents) for the restoration and reconstruction of damaged buildings and structures." Another respondent highlighted the distinction between needs in urban and rural areas: *"Most of the needs our partners are seeing are in small towns and villages. The needs there are in some ways easier and more basic than in a city or*	17 (mentioned in 15% of comments)

	town with large buildings. However, they lack the skills, tools and power for their basic repairs. Many Evacuation drivers have adequate construction skills to help and transfer, however they lack the tools and supplies."	
Lack of or inadequate shelters and challenges assessing shelters	Significant detail was provided in some of the comments in this area which described the unsafe housing conditions for many IDPs and residents (electrical issues, no heating, lack of toilets, leaks, poor ventilation, damp living areas). Many people also mentioned a simple lack of shelter for IDPs as well as many people living in dangerous building due to structural damage. Other comments also mentioned a lack of provision for long term IDPs and challenges with documentation and inspections.	17 (mentioned in 15% of comments)
Inadequate legislation, challenges with local authorities	Within the 14 comments 3 people directly mentioned challenges within legislation such as contradictions and poor (too many) regulations. Most comments focused on local authorities and bureaucracy, slow procedures, lack of coordination and cooperation and challenges with approval of documents and obtaining permits.	16 (mentioned in 14% of comments)
Lack of communication /coordination/ information	Comments were received around the challenges of effective coordination, the flow of information between actors, lack of strategy and the need for prioritisation of work. Note. This category overlaps with that of *legislation and local authorities*, communications between humanitarian efforts and local authorities appears in in the latter category.	12 (mentioned in 10% of comments)
Other	These comments did not follow any trend and therefore have not been categorised. They ranged from food insecurity, need for cash assistance, psychosocial support, language, slow project, project stopping , weather, migration, corruption and the lack of confidence in one own ability.	17 (mentioned in 15% of comments)

Table 4 Key challenges summarised

Although many of the challenges mentioned in the above table, such as funding and instability, fall outside of the scope of RedR UK's current programme, they are important to be considered during the development of any training.

The lack of specialised personnel as a key challenge reinforces the need for rapid training in order to support those on the ground who are often picking up tasks that are outside of the specialisation. In addition, information contained in these comments regarding shelter and infrastructure and material and equipment can be directly referenced in the training.

Capacity Gaps and Learning Needs

Respondents were asked to prioritise their learning needs for both technical and non-technical areas of learning; this section is therefore divided into the two categories.

Technical learning needs

The figure below illustrates how the technical learning needs were prioritised when respondents were asked to select their top three priority areas. The learning priority areas are extremely varied with a wide range of needs. Overall, the area which was selected most frequently as respondents first priority was that of *Rapid damage assessments and classifications of buildings* (19.7%) followed by *Blast effect on structures* (17.4%) and then *Load calculations and computer modelling* (10.6%). However, the area which was most frequently selected within the top three was that of *Building and shelter construction/reconstruction* (40.6%).

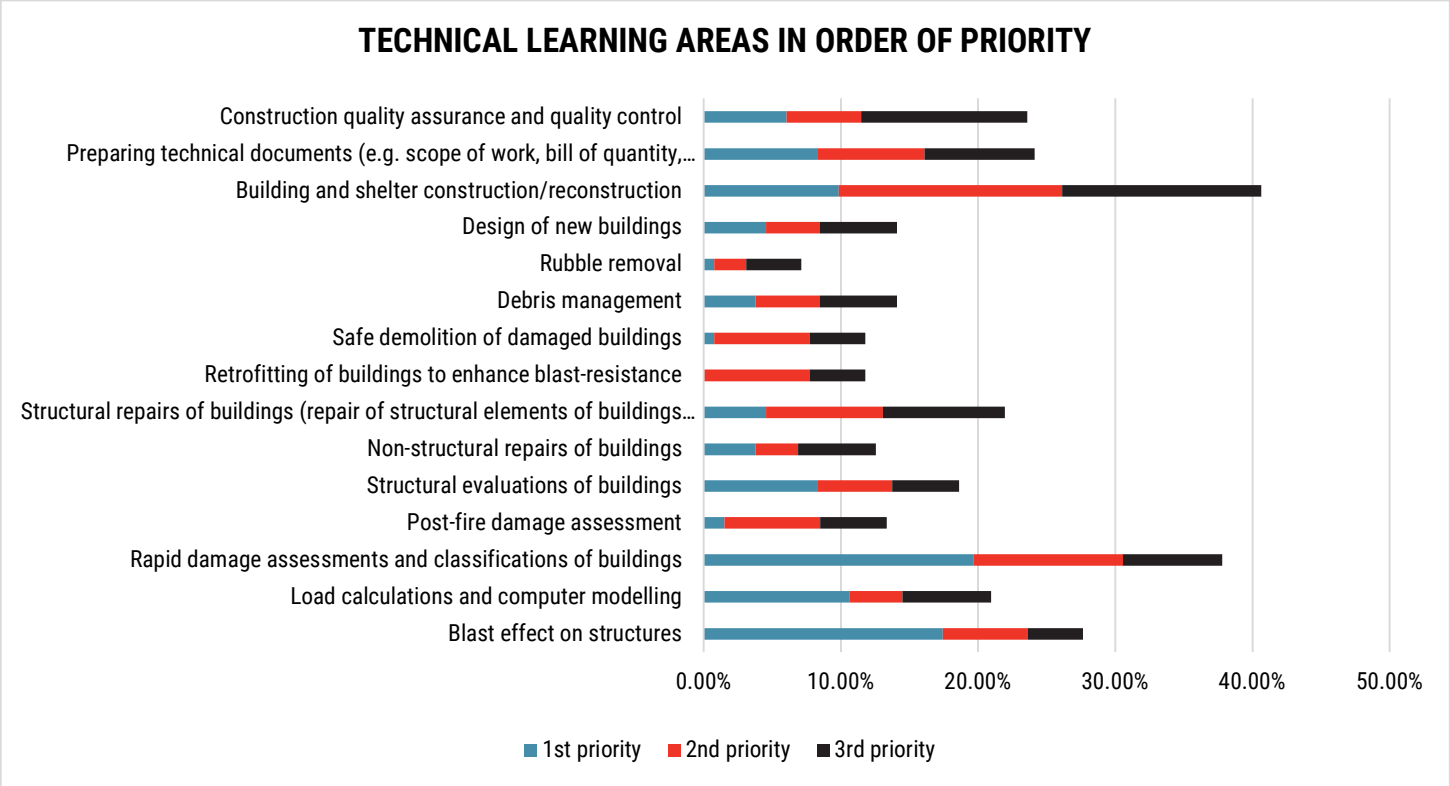


Figure 9 Technical learning needs prioritised

When the data is disaggregated by CC2 and CC3, the priorities shift very slightly, with *Blast effect on structures* as first priority *(23%) and Rapid damage assessments and classifications of buildings* as second priority. This demonstrates a clear overlap between respondents with what high technical knowledge and qualifications deem as a learning gap/need and all other respondents who vary in their technical capacity.

Looking at the data more closely, and filtering by gender, there is some variance within the priority areas for technical support, however *Building and shelter construction/reconstruction* remains in the top three areas for both men and women. Other areas such as *Preparing technical documents, Construction quality assurance and quality control* and *Load calculations and computer modelling* only appear in the priority areas for women. Whereas *Rapid damage assessments and classifications of buildings* and *Building and shelter construction/reconstruction* appear more men's priority. Below is a table showing the priority areas for gender, see annex 3 for full breakdown by gender and technical area.

MEN	WOMEN
Overall scores for the top ranking areas that were selected as either 1st , 2nd or 3rd priority	
Rapid damage assessments and classifications of buildings (highest overall selected 40.3%, with 25.9% as first priority)	**Building and shelter construction/reconstruction** (highest overall selected by 42.5%, with 10% as first priority)
Building and shelter construction/reconstruction (overall selected by 39.6%, with 9.4% as first priority)	**Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)** (overall selected by 35.6%, with 10% as first priority)
Blast effect on structures (overall selected by 36.8%, with 22.4% as first priority)	**Construction quality assurance and quality control** (overall selected by 29%, with 8.5% as first priority)
Area with the highest score for the 1st priority	
Rapid damage assessments and classifications of buildings (highest score for first priority 28.9%) To note this is the same as the highest overall score for men	**Load calculations and computer modelling** (highest score for first priority 14.9%)

Table 5 Top 3 technical learning needs by gender

When disaggregated by disability, the top areas are *Blast effect on structures* and *Load calculation* followed by *Construction quality assurance and quality control*.The technical areas in least need of learning support are: *Rubble Removal (9.6% selected), Safe demolition of damaged buildings (12% selected, none as first priority)* and *Retrofitting of buildings to enhance blast-resistance (12% selected, none as first priority).*

The final point, *Blast effect on structures,* is the 10th (out of 14) competency area confirming that there is both a learning need and a capacity gap. By contrast *Building and shelter construction/reconstruction* despite being a priority learning need is fourth highest within the current competency of the respondents.

Safe demolition of damaged buildings and *Retrofitting of buildings* (the two lowest competency scores) did not score high on the learning need. This might imply that respondents feel there are other priorities at this time or that whilst they may not have experience in the task, learning or training support is not required.

Respondents were also invited to make a further comment on other possible topics in this area. These comments are listed in full in annex 4 and summarised below using seven trends noted in the comments:

Assessment

Whilst rapid damage assessment was noted in the options to select the priority areas, a significant number of additional comments (9 in total) were also raised in this area. These ranged from requesting detailed inspection of structures and buildings to a highly specialized assessment of the serviceability of damaged buildings and assessment of damage to metal structures.

Specific tools/technology

Six people commented on the need for skills building on specific technical tools such as:

- CAE systems applications
- Modern hardware and software for design, construction management, construction documentation, Building Information Modelling (BIM), computer-aided design (CAD), etc.
- Innovative materials and technologies for renovation
- Temporary reinforcement design

Construction/reconstruction

Whilst construction and construction quality assurance were options to select for priority areas of learning, six additional comments in this area were also received. These involved questions/requests regarding:

- The requirements for reconstruction by Ukrainian legislation (Can a construction organization ignore design and material requirements (those that do not affect safety) when donor's funding for repairs is limited? This means insulation, vapor barrier, treated wood, etc).
- Demolition of the old housing stock and relocation of industrial facilities and technical standards of buildings adapted for collective shelters.

WASH related

Two specific WASH related learning requests were received relating to:

- Restoration of water supply systems. Installation of water purification systems
- How to install a manual water pump.

Government related areas

Three requests were received relating to an improved understanding of the current procedures used by the Ukrainian authorities and how to improve communications with authorities.

Environment related areas

Four people highlighted the need for learning related to environmental issues. This included:

- Environmental impact of the damaged buildings and repair
- Cleaner building construction focusing on climate change

Other areas

Other areas that were listed ranged from

- How to assess impact on territory for reporting to donors
- A course in electricity (at least elementary)
- Heat capacity of the house, and temperature screening of buildings to improve and save costs
- Calculation of explosion resistance of buildings
- Safety measures
- Energy utilisation

Table 6 Summary of other technical learning needs

Recommendation

It is recommended that RedR UK begin delivering training on five areas with the following order of priority which takes accounts the differences in gender:

1. ***Building and shelter construction/reconstruction***
2. ***Rapid damage assessments and classifications of buildings***
3. ***Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)***
4. ***Blast effect on structures***
5. ***Construction quality assurance and quality control***

During development of the training courses, RedR UK should consider the requests made in table 6 and where possible include topics as cross cutting themes or as additional short knowledge products to complement the trainings. For example, a knowledge product on environmental issues related to damaged buildings, Ukrainian legislation and communicating with the appropriate authorities. These products might be in the form of PDF guidance notes, short webinars, animated videos or expert Q&As.

Non-technical learning priorities

Respondents were asked to prioritise learning areas that were not related to engineering but that would have greatest impact on the work if RedR UK were to offer a learning programme. 61% of respondents selected project management as one of the three highest priorities.

The three top areas respondents felt a learning programme would have the highest impact within their work (see figure 7 below for full details) are as follows:

- **Project management** - 61% of respondents selected this as one of the three highest priorities, 36% selected it as first priority.
- **Coordination** (with the international relief system) - 44% of respondents selected this as one of the three highest priorities, 24% selected it as first priority.
- **Monitoring and evaluation**- 39% of respondents selected this as one of the three highest priorities, 11% selected it as first priority.

The same top three learning priorities remain when these results are disaggregated by gender and if the respondent has been involved in damage assessment and is currently responding to the crisis in Ukraine.

For respondents who have a disability *financial transparency and anti-fraud measures* is more of a priority, however, coordination and project management remain the top two areas of interest. If focusing on

respondents who work in the private sector whilst the top three areas remain the same, protection and humanitarian principles (13% as first learning priority for each) also appear as a learning need.

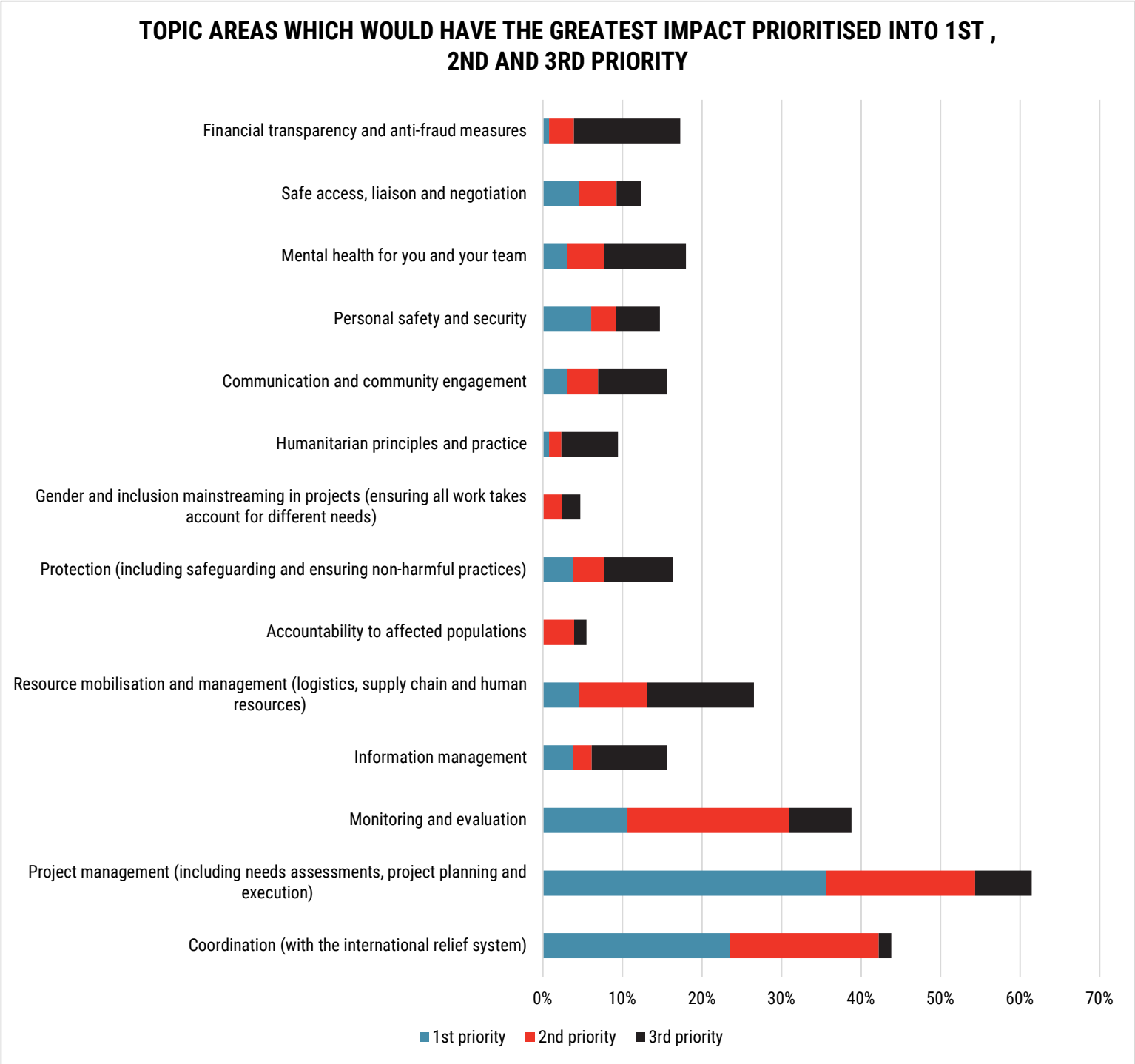


Figure 10 Non-technical learning needs prioritised

Other non-technical requested topics

Respondents were invited to comment on any other non-technical topics not mentioned in the survey that were critical for their role, and that they would like to receive training on. 23 comments were received, within these comments no trends appeared for categories. Two people comment on the need for English language, all other comments only appeared once and ranged from fundraising to advocacy, WASH, Environmental assessments and strategic Environmental Assessment, management of infrastructure restoration projects, interaction with local communities and protection of minority groups.

Recommendation:

It is recommended that RedR offers non-technical training alongside and embedded with the more engineering focused elements and contextualises this training with subjects of shelter and engineering related projects in the following subjects:

- ***Project management***
- ***Coordination (with the international relief system)***
- ***Monitoring and evaluation***

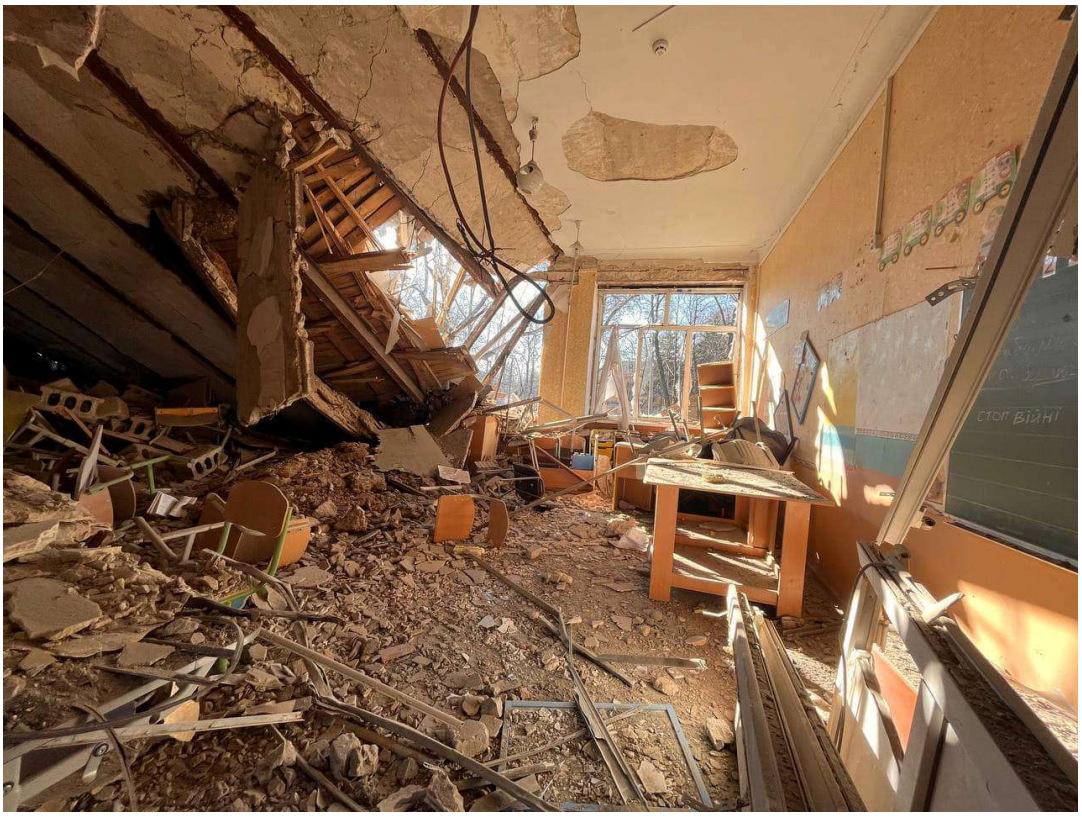


Figure 11: A damaged classroom in Dneper Kiev. Photo provided Kuzma Kolesnyk

Learning Preferences

In this section various learning preferences are explored. A total of ten questions were asked to ensure that RedR UK can provide not only the content that corresponds to the needs but also the format and time of delivery. Each question has been disaggregated by gender and disability; only a few questions showed any difference between preferences of these groups. These questions are highlighted; for all sections where there is no mention of disaggregated data, this is due to no significant difference.

Preferred mode of delivery for learning programme

Respondents were asked to rank their preferences for engaging with learning. They were provided with a list of 9 different options (see Annex 1, interview questions for full list). The most popular form of learning for both women and men was: *online live interactive sessions which you join at a specific time and discuss, interact and receive feedback from trainers and other participants* (35% voted this as their first preference).

The second most popular form of engagement for respondents was *online live presentations which you join at a specific time and can submit questions and comments (similar to a large webinar)* (overall 54% voted this as their first or second learning preference). A third preference was *short online modules which you complete at your own pace,* however there is a significant drop in the preference with just 34% voting this as first or second *preference*. Figure 11 below gives a summary of the first two choices of learning preferences ranked by respondents (out of a ranking of all nine methods).

By far the least popular learning solutions were, face-to-face working groups, on the job mentoring and coaching with only one or two percent listing these as their first option.

PREFERRED MODE OF DELIVERY FOR LEARNING	RANKED AS NO. 1
Online live interactive sessions which you join at a specific time and discuss, interact and receive feedback from trainers and other participants	35%
Online live presentations which you join at a specific time and can submit questions and comments (similar to a large webinar)	22%
Short online modules which you complete at your own pace	16%
A mixed programme, which has some interactive online sessions and some online modules you complete at your own pace	11%
Face to face interactive training where you join in person at a specific time to discuss, interact, practice skills and receive feedback from trainers and other participants	7%
Pre-recorded online presentations or videos which you can download and watch in your own time	4%
On the job coaching, where you are supported to come up with your own solutions to challenges	2%
On the job mentoring, where you are guided by a more experienced or knowledgeable person on a specific challenge	2%

Online or face-to-face working groups, discussing with peers on specific challenges and issues	1%

Table 7 Preferred modes of delivery for learning

A limitation should be noted with this question which may have influence the results: three of the possible modes of delivery were not translated into Ukrainian for this question, these modes were:

- Online live interactive sessions which you join at a specific time and discuss, interact and receive feedback from trainers and other participants
- Online live presentations which you join at a specific time and can submit questions and comments (similar to a large webinar)
- Short online modules which you complete at your own pace

Recommendation:

It is recommended that RedR UK's response reflects the preference expressed in the survey and delivers an online interactive learning programme with live sessions. Possibly supported by a few webinars on appropriate topics that can also be recorded and watched at a later date.

Time available for learning

The time available to dedicate to learning varies, the most preferred number of hours to devote per week was four. The majority preferred between two to six per week with only a few outliers with the ability to dedicate 20 hours per week. Another question asked the preferred length of a single live session, 66% of respondents opted for two or three hours with only 25% selecting four to five hours.

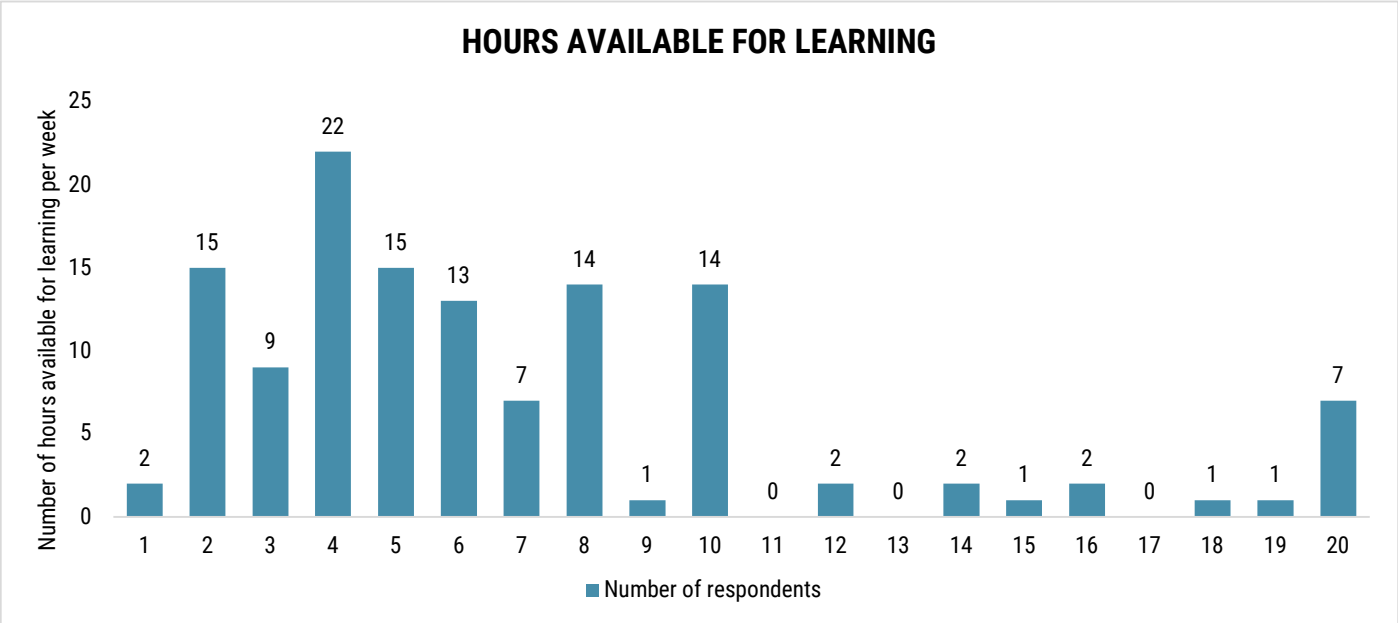


Figure 12 Hours available for learning

Recommendation:

It is recommended that any learning programmes is designed to have no more than five hours per week of learning time with any single live session lasting between two and two and half hours.

Preferred Time of Day for Learning

Respondents were asked to select their preferred time of day for a learning event, they could select more than one option from a drop-down menu and also add a comment. The preferred time of day was the evening with more men preferring this time overall. Women, and those who identified as non-binary, prefer not to say and other, had equal preference between the morning and afternoon.

TIME OF DAY	WOMEN, NON-BINARY, PREFER NOT TO SAY, OTHER	MEN
Evening (between 6pm to 9pm)	35%	49%
Afternoon (between 1 pm to 6pm)	25%	34%
Morning (between 8am to 12am)	35%	27%
Any time of day	17%	5%
Specify the time if your internet access is limited	0%	5%

Table 8 Preferred time of day to learn

Internet access

Despite the regular power cuts in Ukraine (also highlighted as one of the challenges) most respondents had regular internet access as shown in the table below. A few comments were also provided with two people saying that they had internet only after 18.00 or 19.00, whilst there were two people who commented they had access between 9.00 and 15.00/19.00. Another person also mentioned they only have good quality internet whilst in the office. If a learning programme is delivered it is recommended that the event be within working hours to allow for more people to be able to join via their work internet.

HOW REGULARLY DO YOU CURRENTLY HAVE ACCESS TO GOOD QUALITY INTERNET CONNECTION (ABLE TO UPLOAD DOCUMENTS, ACCESS VIDEOS ETC.)?	
All the time	85%
At certain points in the day	8%
Irregularly	6%
Never	0%

Table 9 Access to internet

Preferred day

Respondents were asked to select their preferred learning days with the option of selecting as many days as they wished. The preferred day for learning was Thursday or Tuesday, with a slightly stronger preference for women on Thursday, which is also the preferred day for all respondents overall (women and men). The least popular day was Sunday with Saturday and Monday also undesirable.

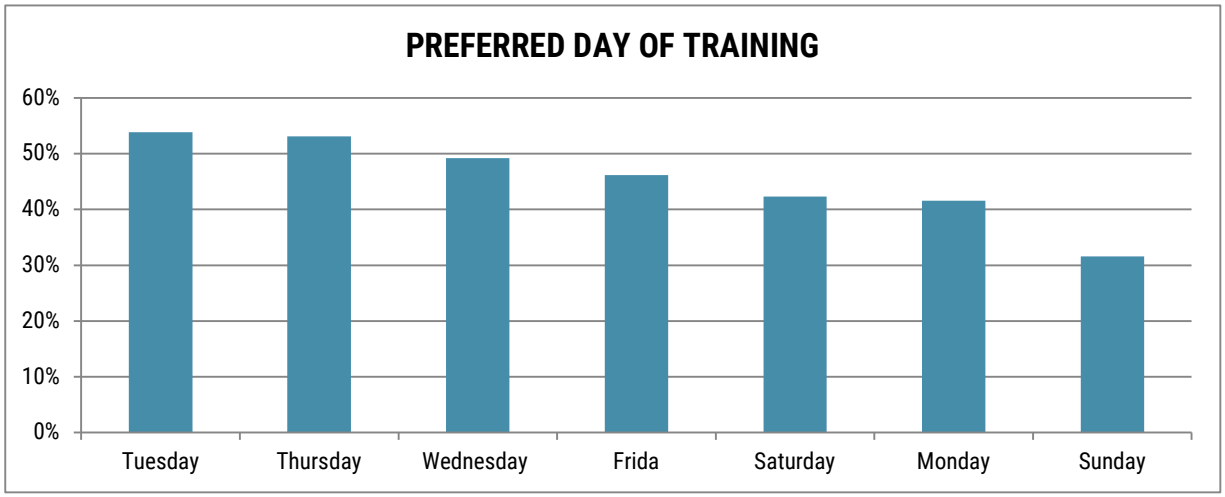


Figure 13 Preferred day to learn

Recommendation:

It is recommended that any learning programmes is delivered in the afternoon on Tuesday and Thursdays, this will allow for more people to have internet access and fall within the preferred day and time of day.

Preferred language for learning

The language preference for over 80% of respondents is Ukrainian. 51% opted for English and 16% selected Russian. Two respondents opted for 'other' and stated German and Italian as preferred language.

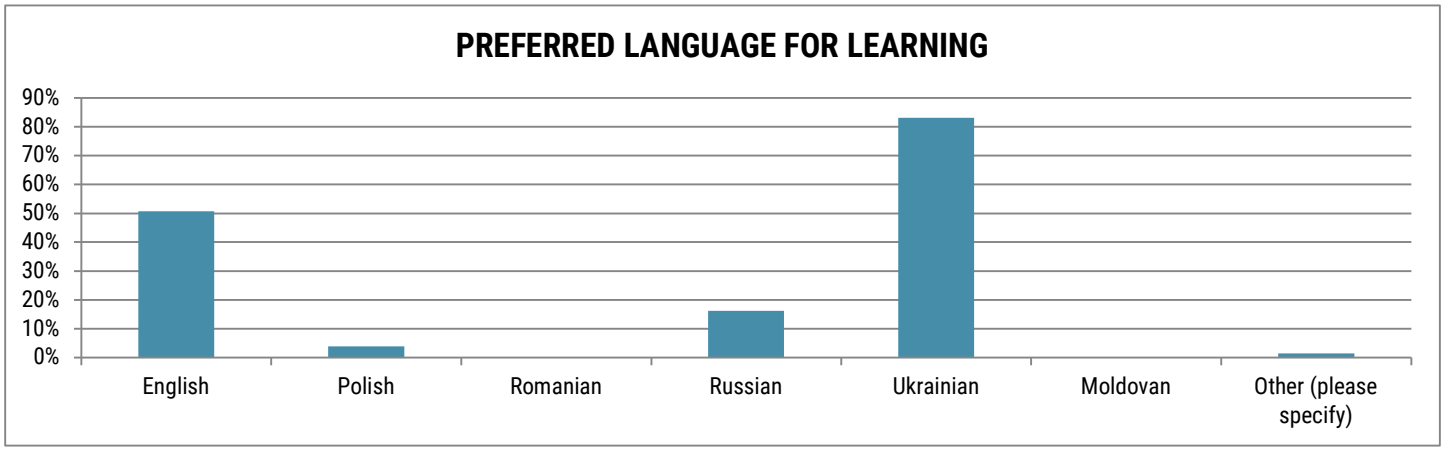


Figure 14 Preferred language

Recommendation:

It is recommended that RedR UK delivers a learning programme in Ukrainian with English translation or offers both Ukrainian and English with the majority of sessions in Ukrainian and every third in English in order to capture a wider range of needs. It may also be appropriate to offer an occasional training in Russian[19] and Polish with suitable advertising.

Preferred types of learning tasks

Respondents were asked if they were to attend a course which involved task completion, what type of assignment would they prefer; individual, group or a combination of both. Nearly half opted for a combination of both these types of assignments. It is worth noting that group assignments may be more challenging to complete as some members may lose internet, go on leave or are travelling to assignments which causes a delay on task completion.

Assignment preferences of respondents:

ASSESSMENT TYPE	% RESPONDENTS PREFERRED OPTION
Individual assignments	28%
Group assignments	23%
A combination of both	48%

Table 10 Type of assignment preferrences

Recommendation

Considering the limited time available and this highlighted as the largest barrier along (see below) with the many competing demands and changing environment it is recommended that group tasks which are conducted offline only be used for people who are working together and can commit to the activity. Otherwise all group work should be conducted during a live session with individual tasks assigned as off line work between live sessions.

[19] Care should be taken during advertisement and delivery if training is delivered in Russian

Barriers in accessing online training

Respondents were asked to highlight any barriers they are currently facing to accessing online training. They had a list of options that they could select, as well as the opportunity to write any other barriers. By far the two most common barriers were *lack of time* and *unaware of what training and resources are available*. It is worthwhile to note too that over 40% felt that they did not experience any barriers.

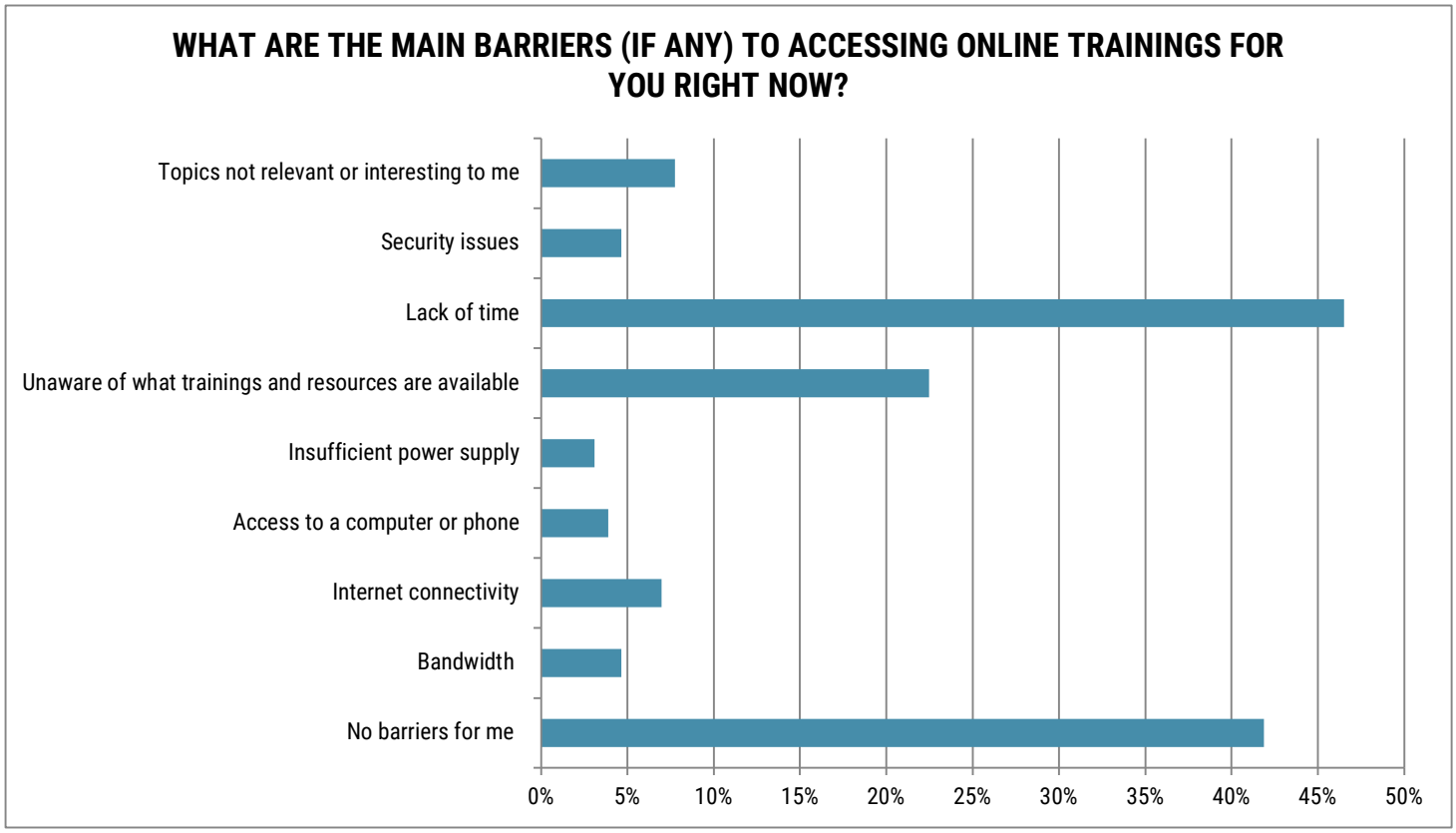


Figure 15 Barriers to access online training

One comment received by RedR UK highlighted the challenges of sporadic internet when staff are working in specific locations. To help overcome this, trainings can be recorded or offered multiple times so if someone doesn't have internet they can catch up on the recording when they return to a more stable location of join the next training on that topic.

Another comment which highlights the need to consider the length of training and the content read:

The trainings thus far seem to be like the early UN trainings "Here are the acronyms, figure it out". No one who is volunteering has the time to waste on something that doesn't help them cut corners. The longer trainings are only practical for those of us away from the front line trying to digest information FOR the people who are DOING the work. We are having to help train them until better training is available.

Comments may also suggest that there is a need for training support in the form for either a Training of Trainers (ToT) or matching technical experts up with learning and training experts so that together they can deliver the learning support required.

It's important that any learning programme consider the content of the training to ensure they are as practical and to the point as possible whereby acronyms are used where relevant and sufficiently explained regarding the use and content. It is worth pointing out that although people working on the front line are extremely time poor, corners cannot be cut at the expense of quality, safeguarding, and embedding a programme that ensures safety. Occasionally, in learning how to 'correctly' (inline with humanitarian principles) implement a programme, collect data or conduct a needs assessments etc., more time may be needed in order to achieve better and safer results.

Recommendation

It is recommended that RedR UK carefully considers how to ensure adequate communication regarding the learning offer, the days and time etc. and provides an easily accessible resource list for each training (this should be made available without the need to sign up to the training) to help overcome the barrier regarding a lack of awareness of what training and resources are available.

Other considerations during course development

Respondents were invited to comment on any other issues they think RedR UK should consider during the development of the learning programme. A total of 16 comments were received and the full list can be found in annex 6. No trends appeared within these comments, a few more specific comments included requests for:

- Requirements of the current legislation of Ukraine
- Specific structural software and BIM tools
- A course for the cooperation of personnel assessing the damage of buildings with minesweepers, which will provide personnel with the necessary knowledge about explosive objects and the risks of working in buildings damaged by shelling and in which explosive objects may remain.
- Use practical cases and examples to explain
- Asses or 'pay attention' to the course already implemented in Ukraine on the full cycle of restoration of buildings and structures damaged by the war: inspection - design - execution of works - commissioning - further monitoring.

It is worth noting that from RedR UK's research there are no other courses currently available for Ukrainians that are free of charge and dealing with assessment of structures and blast damage in humanitarian contexts.

Recommendations

Recommended topics

It is recommended the RedR UK design and deliver technical training within the following topic areas (listed in order of priority):

1. Building and shelter construction/reconstruction
2. Rapid damage assessments and classifications of buildings
3. Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)
4. Blast effect on structures
5. Construction quality assurance and quality control

During the development of these modules RedR UK should consider the requests made for additional training topics and where possible include topics as cross cutting themes or as additional short knowledge products to complement the trainings. For example, a knowledge product on environmental issues related to damaged buildings (such as asbestos[20]), Ukrainian legislation regarding buildings and communicating with the appropriate authorities. These products could be in the form of PDF guidance notes/toolkit, short webinars, animated videos, key message documents or expert Q&A sessions.

To complement these areas the following non-engineering related subjects should also be made available, or ideally embedded within the technical training course itself:

- Project management
- Coordination (with the international relief system)
- Monitoring and evaluation

RedR UK should draw from its existing training being delivered in these topic areas for their Ukraine response and, where possible, contextualise the content to shelter and engineering case studies. For example, project management examples should be based around scenarios for shelter projects.

It is recommended that RedR UK signposts learners to existing training for areas in which there was some interest but will not be developing learning programmes. Some of this training may be available through RedR UK for example RedR UK already offers many training on non-technical areas for Ukraine that may be of interest for those specifically working in the private sector such as protection and humanitarian principles. The other platforms which learners might find useful for free courses are: Disaster Ready's free online courses

[20] For more information see: Rebuilding Ukraine: The imminent risks from asbestos, Olivia Nielsen, Dave Hodgkin, June 2022: https://www.preventionweb.net/blog/rebuilding-ukraine-imminent-risks-asbestos

(many of which now in Ukrainian), UN's courses and the Kaya platform. However, none of these currently cover engineering specific content.

Despite a low prioritisation of gender and inclusion within this learning needs assessment, every effort should be made to ensure that opportunities to mainstream these areas are capitalised on to support any construction/shelter/retrofitting/quality assurance also considers the safety and access for women, people with disabilities and marginalised groups in Ukraine. Should RedR UK require gender experts and/or reviewers they can reach out to the Gender in Humanitarian Action Working group (GIHA) and the Disability Inclusion Working Group in Ukraine where RedR UK already has connections via other work streams.

All modules should consider how to address decolonisation and re-enforce the capacity and strengths of the local engineers, building trust between national and international actors. The language used will also need consideration to ensure it is inclusive and does not further entrench gender norms or power imbalances between different ethnicities or high income and middle- and low-income countries. This area of work should build on the recommendations provided in the RedR UK LNA in December 2022 regarding decolonising.

In is also recommended that RedR UK continue to investigate the learning gaps by consulting the humanitarian sector more broadly on what the capacity challenges and potential needs are that they perceive when working with contractors and technical specialists. It could be that the contractors and technical specialists are unaware (or less aware) of some of the areas, such as safeguarding and protection, in which humanitarians have identified as a need. Their feedback should be taken into consideration in conjunction with further discussions with engineers and technical specialists. This will interrogate the Jahari window[21] of understanding whereby areas of knowledge and consciousness that are unknown to self can be explored.

As RedR UK advances in its programme it is recommended there is continuous monitoring and learning to adjust the learning offer and to explore options of making the training as widely accessible, yet remaining affective, as possible. This might include more learning materials that are accessible offline or self-paced and look into the appetite and need for a ToT training to enable knowledge to be further cascaded.

Recommended mode and type of delivery

Mode

[21] The Jahrai window was developed in 1955 by two American psychologists, Joseph Luft and Harrington Ingham. The four quadrants or "panes" of the Johari Window are: Open Self (or open area/free area/public area) Blind Self (or blind area/blind spot) Hidden Self (or hidden area/avoided self/façade) Unknown Self (or unknown area/area of unknown activity) https://cmsvoc.co.uk/blog/what-is-the-johari-window-model/#:~:text=The%20four%20quadrants%20or%20"panes,area%2Farea%20of%20unknown%20activity)

Online live interactive sessions which you join at a specific time and discuss, interact, and receive feedback from trainers and other participants should be the priority for all topics listed above. To help overcome barriers that some people may face due to internet and travel, trainings can be recorded and/or offered multiple times throughout a given period so if someone mises a live session due to power cuts and internet they can catch up on the recording or join the next training on that topic.

For longer training programmes that require multiple sessions it is recommended that certain topics be recorded in the form of a webinars or animated videos where appropriate, these can also be recorded and watched at a time that suits the learner.

If individuals are required to complete tasks such as assignments outside of the live session it is recommended that each course considers the type of assignment on a case-by-case basis as to whether it is feasible to have group tasks or if individual tasks are more feasible. Where people who are working together and can commit to a group activity this may be an option. However, an alternative individual task should always be available for learners so that they are not limited by the lack of availability of a group member(s).

Duration

RedR UK should ensure that no singular learning programmes is designed to have more than five hours per week of learning time with any single live session lasting between two and two and half hours. If additional work is required outside the live session this should be kept minimal or be factored into the learning time of no more than five hours. Live session should be delivered in the afternoon on Tuesday and Thursdays to capture the most participants. Occasionally a session could be repeated in the evening to enable those only with internet connection in the evening to join.

Language

It is recommended that RedR UK delivers a learning programme in Ukrainian with English translation or offers both Ukrainian and English with most sessions in Ukrainian and every third repeated in English in order to capture a wider range of needs. It may also be appropriate to offer an occasional training in Russian or Polish, although this would be need substantial lead in time to ensure enough participants can participate.

Communication regarding the training

In order to ensure that RedR training is available to engineers and people responding to the Ukraine crisis, more coverage will be needed within engineering and shelter networks. One of the barriers listed was that people are not aware of the trainings and resources, in addition RedR UKs engineering networks in Ukraine are not as extensive as other parts of the world (such as Iraq and Syria), this is demonstrated by the lower-than-expected number of engineering respondents to the LNA. It is therefore recommended that RedR UK carefully considers how to ensure adequate communication regarding the learning offer and immediately begins to build awareness of its intended programme within the engineering and shelter communities in Ukraine. To begin with, partnership mapping could support the process whereby possible partners such as engineering organisations, municipalities with responsibility for infrastructure, institutions, universities that offer engineering, the engineering diaspora from Ukraine etc. should all be considered.

In addition, it would be beneficial if RedR UK could produce an easily accessible recourse list (possibly in the form of a short toolkit) for trainings, this should be open source to help overcome the barriers people are facing regarding which resources are available and how to access them. Such resource list(s) could also be used to help raise awareness of RedR UKs work in this topic area and advertise the course(s).

Commitment to localisation

Recognise the local expertise in the region and collaborate with local consultants, engineering institutes and national CSOs who can facilitate training. Across all topic areas listed (see figure 3) some respondents noted that they were very confident and could teach others. However, within the learning needs identified in this LNA the following skills from respondents were listed as highly confident with the ability to teach others whilst also noted as a learning need within the sector:

- Preparing technical documents (e.g. scope of work, bill of quantity, scoring criteria)
- Construction quality assurance and quality control

When soliciting the skills of skilled professionals that remain in Ukraine it is important to also appreciate limits of the time they may have available for RedR UK. It is recommended that RedR UK draw from the national skilled pool of professionals to deliver a learning programme, where possible, without placing an extra burden on them. In some (or many) cases, this may mean that international professionals will be required for certain training sessions, possibly with a national on the ground member only entering for a final question and answer session or playing a supporting role to minimise the burden on them. However, the final decision on the balance between national and international consultants working on the programme should be decided by availability and preference of the national consultants.

Other possible ways of collaborating with local specialists as resource persons and/or trainers are:

- Share experience and examples of promising practices
- Support contextualisation of content and case studies/examples
- Deliver or co-deliver training
- Invite national experts during question and answer sessions

During programme design, bear in mind that if expectations are for individuals to deliver online training independently, who are not registered RedR trainers, an online ToT is recommended.

RedR UK are also encouraged to work with or through national engineering institutes, membership bodies and CSOs where possible in order to support their efforts and ensure there is two-way learning. This will also increase RedR UKs reach in Ukraine and ensure the learning programme is appropriate for the context.

Annex 1: Survey questions

1	In which country are you currently located (В якій країні ви зараз перебуваєте)?
2	If applicable, which city or region are you currently located (У якому місті та регіоні ви зараз перебуваєте)?
3	Are you currently working on or supporting the ongoing crisis in Ukraine (Ви зараз працюєте над підтримкою України під час поточної кризи)?
4	What type of organisation do you work for? (У чому дурість організації, на яку я не працював?)
5	Which of the following would best describe your current role (Що з наведеного найкраще описує вашу поточну роль)?
6	What is your level of technical experience (Який ваш рівень технічного досвіду)?
7	If applicable, which is your class of consequence (Якщо застосовно, який ваш клас наслідків)?
8	What is your gender (Яка ваша стать)?
9	Do you have any disability (Чи маєте ви якусь інвалідність)?
10	Since the start of the invasion in February 2022, have you been involved in damage assessments, building repairs and/or demolition (Від початку повномасштабного вторгнення в Україну в лютому 2022 року чи брали ви участь в оцінці збитків, ремонті та/або знесенні будівель)?
11	What experience do you have working in the humanitarian sector (Який у вас досвід роботи в гуманітарній сфері)?
12	How would you rate your knowledge and confidence in each of the following technical areas? Як би ви оцінили свої знання та впевненість у кожній із наступних технічних галузей?
13	What tools or technology do you use or are available to do your work? Please check all that apply- (Які інструменти чи технології ви використовуєте або доступні для виконання вашої роботи? Позначте все, що підходить)
14	What are the 3 biggest challenges you are currently experiencing working in Ukraine (14. З якими 3 найбільшими проблемами ви зараз стикаєтесь, працюючи в Україні)?
15	If RedR were to offer a learning programme to improve your capacity to respond to the crisis in Ukraine, which of the technical topics below would have the greatest impact for you, your team and your work? Rank 1st, 2nd and 3rd priority (Якби RedR запропонував навчальну програму для покращення ваших можливостей реагувати на кризу в Україні, яка з наведених попередньо технічних тем мала б найбільший вплив на вас, вашу команду та роботу? 1-й, 2-й і 3-й пріоритет)
16	Are there any other technical topics not mentioned that are critical for your role, and that you would like to receive training on (Чи є якісь інші незгадані технічні теми, які є критичними для вашої посади, і з яких ви хотіли б пройти навчання)?
17	If RedR were to offer a learning programme to improve your capacity to respond to the crisis in Ukraine, which of the other topics would have the greatest impact for you, your team and your work? Rank 1st, 2nd and 3rd priority (Якби RedR запропонувала навчальну програму для покращення вашої здатності реагувати на кризу в Україні, яка з тем, наведених нижче, мала б найбільший вплив на вас, вашу команду та вашу роботу? 1-й, 2-й і 3-й пріоритет)
18	In your opinion, which of the non-technical competencies listed below are most critical for your current role? 1st, 2nd, 3rd priority (На вашу думку, які з наведених нижче нетехнічних компетенцій є найбільш критичними для вашої поточної посади? 1-й, 2-й, 3-й пріоритет)
19	Are there any other non-technical topics not mentioned that are critical for your role, and that you would like to receive training on (Чи є якісь інші незгадані нетехнічні теми, які є критичними для вашої ролі, і з яких ви хотіли б пройти навчання)?

20	What is the total number of hours (per week) you can dedicate to this kind of training (both live sessions and personal study)- Яку загальну кількість годин (на тиждень) ви можете приділити цьому навчанню (як живі сесії, так і індивідуальне навчання)?
21	If there is only 1 taught session a week, what is the total number of hours that you could dedicate to one continuous live (taught) session? (Якщо є лише 1 навчальна сесія на тиждень, яку загальну кількість годин ви можете присвятити одній безперервній живій (навчальній) сесії?)
22	Based on your daily routine and environment, which would be the most appropriate delivery mode for you and your teams? Please prioritize the list below with your preferred option first, using the arrows to the right. (Виходячи з вашого розпорядку дня та навколишніх обставин, який спосіб доставлення буде найбільш прийнятним для вас і ваших команд? Будь ласка, виберіть бажаний варіант у списку нижче, скориставшись стрілками праворуч)
23	How regularly do you currently have access to good quality internet connection (able to upload documents, access videos etc.)? (Наскільки регулярно ви зараз маєте доступ до якісного підключення до Інтернету (можете завантажувати документи, переглядати відео тощо)?
24	What are the main barriers (if any) to accessing online trainings for you right now? (Select all that apply)- Які основні перешкоди (якщо такі є) для доступу до онлайн-тренінгів для вас зараз? (Виберіть усе, що підходить)
25	What is your preferred language for learning (На якій мові ви б хотіли навчатися) ?
26	If you were attending a course that required task completion, would you prefer to submit individual assignments during the course, or be involved in group assignments? (26. Якби ви відвідували курс, який вимагає виконання завдань, ви б віддали перевагу отримувати індивідуальні завдання протягом курсу, чи брати участь у групових завданнях?)
27	What time of day suits you the best for an online training? Multiple choice (Який час доби вам найбільше підходить для онлайн-тренінгу? Широкий вибір)
28	Do yo you prefer the training to be on which day of the week (У який день тижня ви віддаєте перевагу тренуванням?).
29	Is there anything else you would like to share that we should consider in developing this course (Чи є ще щось, чим би ви хотіли поділитися, щоб ми врахували при розробці цього курсу)?
30	If you would like to be informed when this training is available and would be happy for us to contact you, please share your details below (30. Якщо ви бажаєте отримати інформацію, коли цей тренінг буде доступний, і будете раді, якщо ми з вами зв'яжемося, будь ласка, поділіться своїми даними нижче):

Annex 2: Specific roles of respondents

List of respondents' roles who did not identify as one of the given categories and selected 'other' in the question regarding their current role.

Head of International Affairs and Fundraising
Ecology, agriculture and communication with benefits
War crimes watchdog
Engineer in the building safety sphere
Education
Expert in technical inspection of buildings and structures
Professor of Construction Department, National University of Life and Environmental Sciences of Ukraine
University lecturer of civil engineering
Social worker
Other WASH practitioner. Specialist of organizing compact settlements, bridge builder + other
Lawyer on environmental protection
Shelter Cluster coordinator (Quantity surveyor)
I'm an Attorney-at-law with experience in real estate and land law projects. Since 2022 I'm working in Danish Refugee Council as a Protection Officer (Senior Associate) capacity building officer and helping national NGOs to provide legal aid.
Monitoring and evaluation officer
Shelter Project Manager (Water supply engineer)
Civil protection trainer
Housing/ shelter search and officer for the redistribution of non-food items
Area Manager for Ukraine response project
Protection social worker
Regional coordinator
Psycho-social support of the population
Lawyer
Volunteer
Training Coordination
PR
Sypply chain - procurement
HR
MEL Specialist
Partnership Technical Lead
Distribution officer of basic needs
Security staff
Compliance officer
Basic needs officer

I provide energy efficiency audits of buildings, their inspection and the development of documentation for repairs and author's supervision
Financial manager
Partnerships coordinator
Accountability to Affected Population
Administrator
Psychology support
Psychologist)
CRM team
PMER

Annex 3: Key challenges

SECURITY /INSTABILITY/ACCESS CHALLENGES
Data collection in hard to reach territories (front line)
Air alarms and the threat of a missile strike/bombing/shelling x 7
War x 5
Security situation x 7
Uncertainty x 2
Uncertain future: The political and economic situation in Ukraine is unstable and unpredictable. I don't know what will happen next or how it will affect my work and life
Safety & security and challenges to obtain a life insurance
Threat of bombarding: The conflict in the eastern regions of Ukraine is still ongoing and sometimes escalates into violence. I live in constant fear of bombarding and shelling that could harm me or my colleagues.
The level of risk of armed actions in the territories with the greatest damage
Access for hard to reach areas x 4
Damage in the area of hostilities, questions about the feasibility of such restoration and problems with access of contractor organizations to these territories
War, corruption, unemployment
Work on the dividing line
Psychological pressure from bad news, constant shelling of cities
Dangerous situation near war zones, difficult situation with mobilization.
The mined territory prevents free movement of the country
Instability in the whole country.
The biggest problem is the danger for research in the 30-40 km zone from the front line. Regular shelling.
Mined and shelled areas, to be closer to the front line, work with beneficiaries from totally destroyed settlements
Safety issues during work
A high degree of landmines, which slows down safe work processes, risks associated with repeated attacks, problems with logistics
Repeated damage to already restored housing and demining of agricultural land
Russian aggression/invaders x 3
Conduct of hostilities on the territory of Ukraine.
war and everything related to it

INSUFFICIENT FUNDING / INFLATION AND ECONOMIC CHALLENGES
Insufficient funding x 9

Big difference between official and actual (market) prices for engineering works. Market prices are much lower, thanks to price dumping, so we will get little money for complex intellectual work. A similar level of money can be obtained, for example, by physical labor in supermarkets.
Economic decline in the population, which reduced the number of orders/payment for work. Lack of stability in work due to possible mobilization for the army, which forces people to refuse long-term jobs
project financing has been agreed upon for quite some time
Lack of decent pay
Expensive devises for work
Lack of funding for restoration work
low prices
Difficulty in obtaining funding;
Constant increase in the price of building materials x 2
The problem of rapid approval of the budget.
Most of the last mile transportation to these areas are being done by 'non-traditional' volunteers, many independent some with NGOs too small to partner with the UN or big Aid. 2. Access to funding support to the small Hard to Reach areas, because of the complexity and confusion regarding applying for Aid, projects, etc. Many local organizations cannot access these sources of Aid. 3. Connecting the right partners together. No one can do everything that needs to be done, there are people who do things 'best' at this point. They are and will be the innovators. The volunteers that will implement anything are in the Hard to Reach areas, they are stressed out. Reconstruction support from the safer areas to give them some 'backup' would be tremendously helpful.
High inflation due to war
High prices for housing and products
Finding a long-term perspective for people (build new or restore buildings, instead of building modular (short-term))
Economic crisis
The ability to do only current or average repairs, but many buildings require capital.
Financial problems in the country,
Many houses are completely destroyed and require significant funds for restoration.
Suppliers not willing to support the purchase with the additional documents required by donors

LACK OF SPECIALISTS/SKILLED PERSONNEL
Lack of a sufficient number of specialists in construction.
Lack of knowledge about retrofitting damaged buildings after war bombing
Lack of innovative instruments and hardware for researching
Lack of specialists x 3
Lack of experience in designing of bomb shelters (incl. shelters integrated in new budlings);
Intensive training of rapid response teams with the use of equipment and equipment is not enough, and as a result - loss of time and low efficiency of volunteers' actions in the event of a dangerous situation

Insufficient education of members of rapid response teams in providing emergency first aid
I am not interested in this field of work, but there are not enough specialists for me
Lack of qualified performers in territorial communities.
Insufficient knowledge of modern technologies, insufficient time for project work
Lack of personnel - TRC (territorial recruitment centers) take away men from work and on the way to work.
Buildings in the private sector sometimes require major repairs, because structural elements have been damaged by shelling. In this case, humanitarian organizations cannot provide assistance in the form of repairs, because professional monitoring and design solutions for strengthening are required.
Identifying the right people;
Lack of technical inspectors.
Many specialists are drafted into the army or were killed during war, or went abroad as IDP
Mobilization, lack of personnel
The difference of mentality. Very low educational level.
Lack or inaccessibility of highly qualified specialists to improve my own level; Number of contractors capable of performing quality work and on time has become significantly smaller;
Determination of the final bearing capacity of reinforced concrete structures after a fire. Measurement of actual physical and mechanical characteristics of construction materials.
Lack of quality staff
Low level of knowledge of specialist
Lack of qualified personnel x 2
There is insufficient knowledge on the assessment of the building after the explosion

INSUFFICIENT/INADEQUATE/ INFRASTRUCTURE/SHELTER AND CHALLENGES ASSESSING SHELTER
There are not enough bomb shelters. Almost every centre where IDPs live has problems with electricity, and washrooms, showers, and toilets are usually in poor condition. Roofs are leaking in many places. Poor ventilation, high humidity and as a result a lot of mould
Old houses, low level of heat saving, old heating system, water supply problems
Lack of reliable shelters
The problem of lack of a place for long-term residence for IDPs
A large number of abandoned buildings in a state of disrepair in places where active hostilities took place
Short deadlines for the inspection of buildings that were damaged as a result of Russian aggression.
Development of PCD for shelters/dual-purpose structures.
Destroyed bridge
Determination of the final bearing capacity of reinforced concrete structures after a fire. Measurement of actual physical and mechanical characteristics of construction materials.
Some builders do not take into account the importance of proper ventilation of shelters and good insulation of buildings during restorations
Destroyed houses, roofs, structural elements of buildings, destroyed engineering communications.

social housing for IDPs
People do not want to evacuate, even if their homes are damaged and they live in a dangerous area. Danger in the provision of humanitarian aid.
I work in POLAND, it is lack of flats on housing markets, many empty spaces.
The technical documentation of the buildings is too old and not actual for the moment Absence of sewage, water supply and heating system in old buildings Outdated electrical wiring
Repair of buildings and premises
Premises for SS do not meet the standards for human habitation.
Lack of available and appropriate dwellings forces IDPs move back to destroyed houses unoccupied territories experiences negative impact of damaged infrastructure IDPs from occupied territories who moved to rural areas have no support as for housing maintenance and knowledge relevant for that

LACK OF TOOLS/EQUIPMENT
There are no tools and equipment for training civil engineers
Lack of modern and high-quality equipment.
Insufficiency of available material regarding the damage and protection of buildings and structures that suffered as a result of hostilities.
low technical equipment level, low safety level
Lack of resources: The infrastructure and services in Ukraine are underdeveloped and unreliable. I often face power outages, internet disruptions, and shortages of basic supplies. This makes it hard to work efficiently and comfortably.
Insufficient equipment of rescue services and rapid response teams in communities with transport, rescue and fire-fighting tools and equipment
Classification of blast influence on the structures from combat projectiles. A lack of modern CAE systems for structures behaviour modelling under blast conditions. A lack of the experimental data about blast influence on the building structures etc.
Destruction or relocation of construction infrastructure
Delays in the supply of materials.
Power cuts x 2
No free building materials to repair damage and no compensation for damaged property
Identifying the resources to support work in Ukraine
Water supply
Lack of human resources
Lack of equipment and materials x 2
Insufficient amount of equipment, special equipment
Lack of building materials x 2
Most of the needs our partners are seeing are in small towns and villages. The needs there are in some ways easier and more basic than in a city or town with large buildings. However, they lack the skills, tools

and power for their basic repairs. Many Evacuation drivers have adequate construction skills to help and transfer, however they lack the tools and supplies.

INADEQUATE LEGISLATION, CHALLENGES WITH LOCAL AUTHORITIES
Approval of documentation.
Contradictions in legislation
Difficulty and duration of obtaining permit documentation
Before the war, the Ukrainian real estate field was too bureaucratic and corrupt.
Lots of government regulations.
State registers work poorly.
Tax system; non-useful laws acts;
Imperfect legislation, passivity of the population
Local self-government bodies cannot plan for the long term.
Insufficient coordination of local authorities
Bureaucratic procedures in the local authorities,
Passivity of local authorities,
Inadequate cooperation with local authorities.
Coordination with local authorities;
Imperfect legislation in the field of construction.
There are no clear algorithms (approved recommendations, regulatory documents) for the restoration and reconstruction of damaged buildings and structures. A huge number of unfinished objects in big cities. Absence of legal consequences for illegal construction. The nature of chaotic construction in large cities. The low quality of engineering and construction training in higher education institutions is caused by a decrease in classroom hours, a decrease in the number of course projects in the main academic disciplines. Lack of a modern experimental base for quality training of civil engineers.

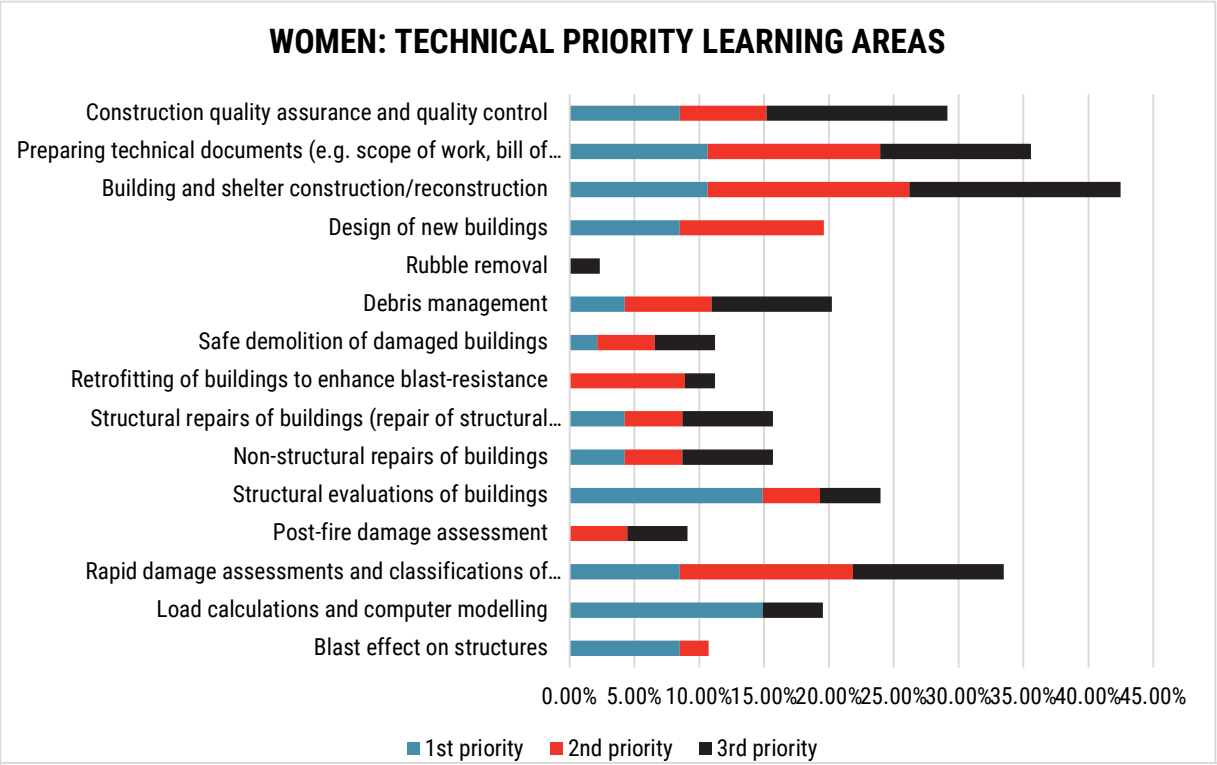
LACK OF COMMUNICATION /COORDINATION/ INFORMATION
Insufficient level of communication between different organizations engaged in reconstruction regarding duplication of the same works
Information vacuum
Communication, local staff collaboration
Communication
Dispersion of assistance (in my opinion, a certain list of centres could be filled, and others returned to work (schools/kindergartens/universities) in order to concentrate NGO assistance on a selected list of centres)
Absence of a regional program for providing housing for IDPs (construction of new buildings, restoration/reconstruction of existing ones)
Bearing structures. Connection of standards with international ones
Lack of reconstruction strategy and plans
Insufficient coordination between the state and UNHCR, between UNHCR partners

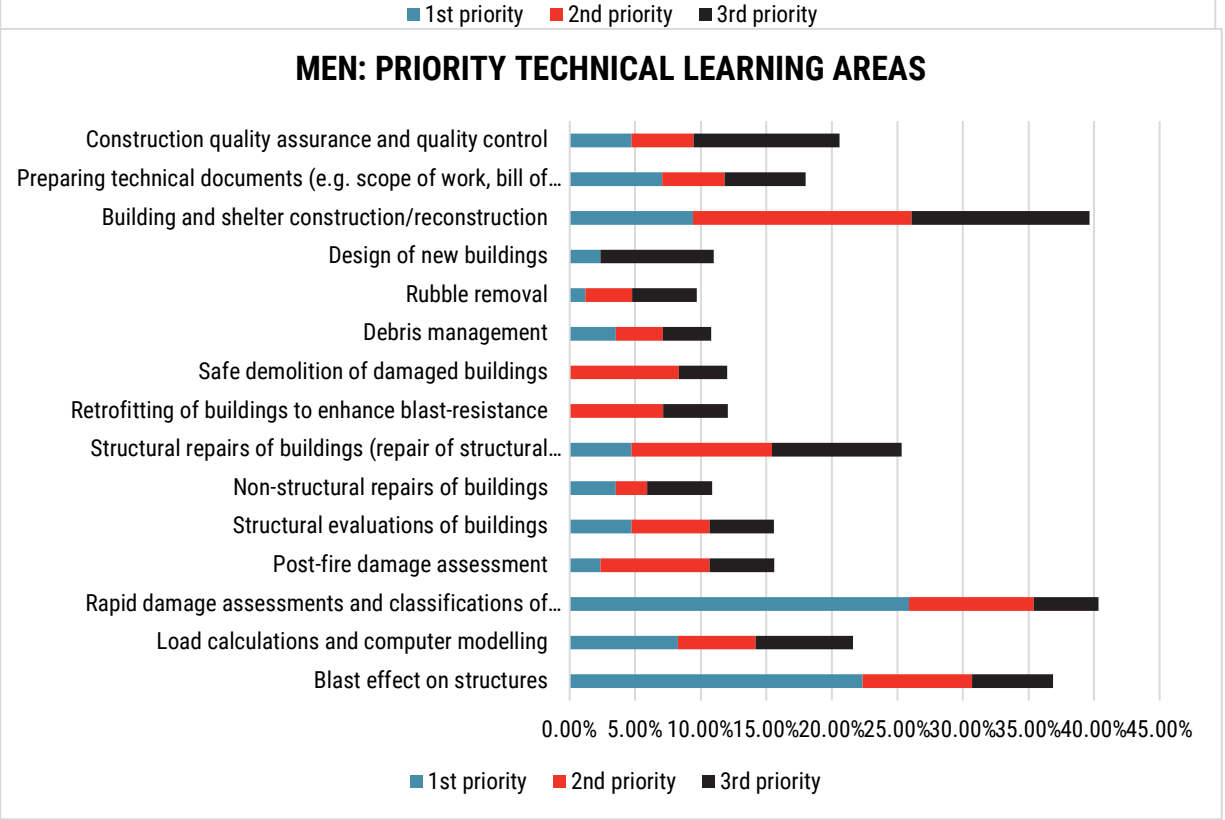
Lack of priority work (identification of centres where people will be accommodated in the long term in order to direct funding and efforts there)
Prioritization
Coordination with local authorities

OTHER
Many households was totally destroyed, we need to help them to overhaul their homes, a lot if people forced to go to safety place, they constantly need food, hygiene, cash and psychological support
Military mobilisation of civilian population
Ignorance of the population
The mismatch between the amount of help provided and the help that is actually needed
Slow-moving pace of project implementation
Lack of faith in one's own strength, doubts about the correctness of decisions, cohesion on the result
Psychological state of the population (workers, representatives of authorities and organizations, local residents, etc.);
Stopping the implementation of projects
Language x 2
I have been working for about a year now, we distribute food kits, hygiene kits, kitchen sets, bedding sets and do medium repairs of damaged houses, in my practice 3271 conversations with beneficiaries who received help from us. Basically, people ask for food and financial assistance for housing rent, utility bills, firewood (if they rent a private house), since many of their own homes were broken or partially damaged. According to the results of the last calls on the questionnaire, there was a trend that they are asking for financial assistance to restore their housing, since some people have returned home. I can name 3 problems: 1) providing IDP with food, hygiene products; 2) providing IDP with dishes and sets for sleeping; 3) financial assistance for housing rent, restoration of one's own housing.
Corruption
Dental care
Migration
A large number of projects
weather
The desire of IDPs to return to dangerous territories, because they do not see other long-term solutions for themselves.
Perception of humanitarian aid in Ukraine

Annex 4: Priority technical learning areas

Priority technical learning areas by gender





All topics listed not mentioned in the areas above respondents would like to receive training on:

ASSESSMENT
Assessment criteria and classification of buildings damaged by the explosion
Detailed inspection of structures and buildings
Assessment and payment of damaged property as a result of Russian aggression on the territory of Ukraine
Structural damage assessment, Procedure and Technical Guidance
A highly specialized assessment of the serviceability of damaged buildings (i.e. a narrow course to determine whether the building is subject to restoration and whether it is economically viable)
Detailed technical inspection of buildings and structures
Assessment of damage to metal structures
Detailed inspection of structures and buildings
To study standardized visual criteria for rapid assessment of the structure of buildings after an extraordinary impact: explosion, fire, collapse, etc. Methods and possibilities of control and forecasting of progressive destruction of conditionally stable structures
SPECIFIC TOOLS/TECHNOLOGY
Improving my skills of CAE systems applications
modern hardware and software for design, construction management, construction documentation, BIM, CAD, etc.
Temporary reinforcement design
The best available technologies
Innovative materials and technologies for renovation
Java
CONSTRUCTION/RECONSTRUCTION
Requirements for reconstruction by Ukrainian legislation. Example: Can a construction organization ignore design and material requirements (those that do not affect safety) when Donor's funding for repairs is limited? This means insulation, vapor barrier, treated wood, etc
Effective and efficient methods of construction, reconstruction of buildings and engineering structures with changes in structural schemes.
Demolition of the old housing stock and relocation of industrial facilities outside the city limits with the subsequent change of the functional zone of the territory and new residential construction
Reconstruction.
Building and shelter construction
Technical standards of buildings adapted for collective shelters.
WASH RELATED
Restoration of water supply systems. Installation of water purification systems
How to install a manual water pump. They are only ~$60USD in Ukraine and could be a tremendous help to those areas that will NOT get power back for a while.
GOVERNMENT RELATED AREAS
An understanding of the current procedures used by the Ukrainian authorities

News in government regulations in the building and rehabilitation
Effective liaise with authorities
ENVIRONMENT RELATED AREAS
Environmental impact of the damaged buildings and its possible repair.
Cleaner building construction focusing on climate change
Changes in the physical and mechanical characteristics of soils in case of deep damage by means of damage that leave funnels. Soil compaction and loosening.
Soils after explosions. Research and strengthening
OTHER AREAS
How to assess impact on territory for reporting to donors
A course in electricity (at least elementary)
Heat capacity of the house, and temperature screening of buildings to improve and save costs
Continuing the topic of explosive impact, it might be appropriate to consider the difference in impact and consequences from different types of weapons.
Calculation of explosion resistance of buildings
Safety measures
List of documents during all steps of construction
Debris management
Energy utilisation

Annex 5: Non-technical learning areas requested

WASH
yes, features of integration in the regions
Advocacy. Coordination with other agencies
All topics are listed
Ways and search opportunities for optimization to attract funds for the restoration of the country's critical infrastructure
I would like to study the art of rhetoric
Communication skills
How to cancel the WAR!
Environmental assessments - SEA and IEA
Management of infrastructure restoration projects
Emotional intelligence
Assessment, programming, technical capacity building,
I am learning English, but I do not have enough speaking skills with native speakers, if you, in addition to excellent online trainings in which I take part, had discussions of problems in Ukraine in English, I would take part in them to improve my level knowledge.
"Best Practices" in critical areas, for example the Best IDP situations, the BEST localized food production practices etc that have been developed so far in Ukraine. Eco-village networks, Houses of Culture, etc how are these orgs being leveraged and what should be copied.
Support of the population during the war
low level of knowledge of the English language
Overcoming the humanitarian consequences of war
Information management
fundraising
Minorities respect/protection in situations of catastrophe
Interaction with local communities
continuous support
Matching human needs for safe and secure sheltering with possible or forecasting dwelling to supply

Annex 6: Learning preferences and development considerations

Below is the full list of comments received for RedR UK to consider during development of a learning programme.

Strengthening of the coordination and communication between the Organizers and Participants.
More presentation of normative literature
Requirements of the current legislation of Ukraine
Any educational course must be presented methodically, consistently, competently. A clear statement of the task, algorithms for its implementation, conclusions, and practical examples of application should be clear. An up-to-date (up to 5 years) list of literary sources, laws, practical recommendations, building regulations, etc. should be provided.
Specific structural software and BIM tools
Please pay attention to the cases already implemented in Ukraine of the full cycle of restoration of buildings and structures damaged by the war: inspection - design - execution of works - commissioning - further monitoring
A course for the cooperation of personnel assessing the damage of buildings with minesweepers, which will provide personnel with the necessary knowledge about explosive objects and the risks of working in buildings damaged by shelling and in which explosive objects may remain
Constant changes in the legislation, there is no specific mechanism that concerns the activities of communities for the purpose of fixing damaged movable and immovable property of individuals, there is no single mechanism for restoration work (or reconstruction). An urgent question regarding work programs, sources of funding for housing restoration, as well as requirements for participation in them. Please pay special attention to damaged immovable property (production, warehouse, office premises) that is privately owned by natural (legal) persons.
The teacher of each technical module should be a narrow specialist in that topic
The experience of surveying buildings and structures damaged as a result of military aggression of the Russian Federation.
If it's a webinar, you can watch it after it's over
I wish I could have answered 'as' one of the people working 'on the ground'. The needs perspective is very different. I've shared the link pretty liberally, so hopefully you will get their insights directly. Thank you again for the quality of questions....I'm so relieved.
time and internet connection
Pay attention to the translation of technical terms and abbreviations that correspond to Ukrainian technical standards
communication
you need to have practical cases and use their examples to tell