 Slovenia – Creative Impact Fund

Modular System for Building with Earth

Developing cost-effective, light and
efficient formwork for building with
rammed earth

Modular System for Building with Earth

Final project report

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OUTSIDER

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Europe

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Linking back to CIRCE

The background of the slide features a close-up, vertical view of rammed earth walls. The walls are composed of compacted earth and aggregate, showing a rough, textured surface. A dark, vertical band runs down the center of the image, creating a strong contrast with the lighter, textured earth on either side. The lighting is dramatic, highlighting the grain and imperfections of the material.

Summary

Our goal with the project is to address the urgent issue of unsustainable construction materials that contribute to climate change and lead to environmental degradation by designing an easy-to-use and cost-effective method of building with rammed earth, which would encourage wider adoption of this sustainable material.



Despite being one of the most environmentally friendly building materials and being readily available almost everywhere, earth has only recently started gaining recognition as a feasible building material in the developed world. The most common contemporary method of building load-bearing walls with earth is known as rammed earth construction. With this, a carefully prepared mixture of loam and sand with a bit of water is laid in sturdy formwork and rammed using manual or pneumatic tools. The process results in a 5-8 cm thick layer of compacted earth, and is repeated until the wall is built. Afterwards, the formwork is removed, and the wall is left to dry for a few weeks. The necessary materials for construction can usually be found locally: either on the building site itself or on those of nearby building and landscaping projects.

However, one of the major obstacles to the wider adoption of this technology is building cost, as rammed earth structures are on average 30% more expensive than those built using conventional methods. The way to lower the cost lies in streamlining and simplifying all the parts of the building process.

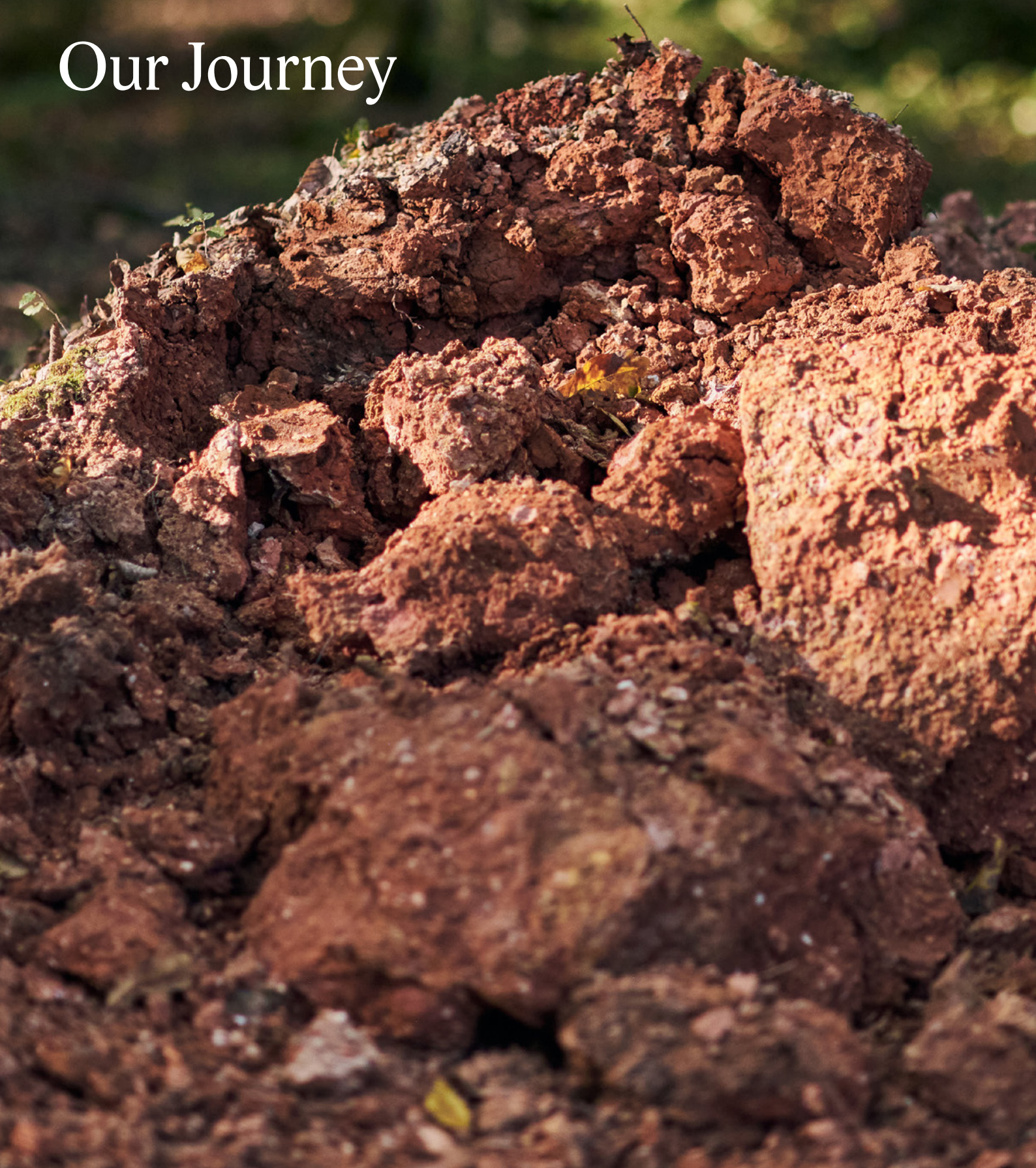
In our project, we have successfully designed a system made out of several different rammed earth modules (a corner, bench, counter, wall section and column). These modules can be built independently or combined to form a complex structure. We have made formwork prototypes for these modules, which are easy to transport and assemble on the building site. After assembly, locally sourced earth (such as waste from building sites) can be used for building the module (by filling the formwork and ramming). We have developed the method of preparation of the right earth mixture efficiently and quickly. To test our design and everything we learned we built two rammed earth benches and a pavilion made out of four L-shaped modules.

The CIRCE project is an organic continuation of our primary activity, which is publishing *Outsider*, a Slovenian-language magazine and web portal covering architecture, sustainable design and culture. Martin Rauch, one of the pioneers of contemporary earth construction, was featured in the first issue of the magazine, and we have been covering the topic of earthen architecture

ever since. Indeed, his work inspired us to promote building with sustainable and natural materials. Our other related activities include the organisation of events, exhibitions, round tables and architecture competitions. In 2021 we organised an international design competition for a rammed earth house, for which we received 469 entries. This incredible response encouraged us to establish the Centre for Building with Earth (Center za gradnjo z zemljo).

Our primary activity is echoed in our unique approach to the innovation process, which includes workshops that are open to outside participants. Attendees – including students and young professionals – have come to these with their own unique creative approaches and skills, while learning about rammed earth construction. The sense of community that has developed during these workshops is also a significant positive outcome of the project.

Our Journey





May and June: Planning and research

We began by defining two main levels of development of our project:

a) Development of a construction system, based on a rammed earth module.

b) Development of the building block of the system – a rammed earth module, and finding solutions for streamlining and simplifying the process of building it. This level of development we have further divided into sub-categories:

- Development of the formwork: What is the most efficient, portable, lasting and easy to assemble system of formwork suitable for our project?
- Preparation of material: How can we master and speed up the process of preparing the earth mixture for ramming?
- Construction and ramming process: What is the most efficient technique for ramming, and how can we coordinate the building process in the most efficient way?

At the same time, inspired by the talks and discussions at the CIRCE symposium in May 2023, we got the idea of a smaller,

parallel project: a series of smaller design pieces made of rammed earth. Objects that would be at the same time a great piece of design and help with making our target audience (potential first customers) familiar with the material and its properties. We commissioned an acclaimed Slovenian architect and designer, Gašper Fabijan, and tasked him with developing the concept.

July: Workshop for students

We already had a hypothesis what kind of modular system would be most adaptable to a variety of scenarios. The one we proposed is based on an L-shaped wall, a corner. Even though we are architects by profession, we are able to imagine only so many ways this modular system can be used. To test the possibilities and the limits of our system, we organised a workshop for young architects and architecture students. For one week, from the 17th till 23rd of July, a small community of eight attendees from Slovenia and two from Austria sprung up in our Centre for Building with Earth in Dobrava pri Škocjanu. Attendees learned the basics of rammed earth technology in

theory and practice, as we built a simple bench out of rammed earth in our project space and learned how to repair a rammed earth wall. We also learned how to make ceramic tiles using the raku technique, and attended a lecture by the artist Matej Andraž Vogrinčič.

But the majority of time has been dedicated to exploring the possibilities offered by the modular construction system we proposed. Each attendee developed a unique plan for either a single-family home or terraced houses, using rammed earth as a basic material. From these projects we learned that the proposed system offers a lot of creative freedom for architects and engineers working with it, provided the properties of the material are taken into account. For example, it is best if rammed earth is used in combination with other types of construction (like wood), and preferably for interior load-bearing walls.



August: From system to the module

Once we knew that the system itself was feasible, we moved our attention to its building blocks – the modules themselves. Throughout August we were researching various formwork designs and technologies, experimenting with different approaches to the construction process and improving our skills in material preparation and building itself. We continued with the proven workshop format, only on a smaller scale: we organised a few one- and two-day workshops with a maximum of four attendees, who we invited through an open call using our mailing list a few days ahead of each event.

We consulted several major companies that develop and produce formwork, learning about the state-of-the-art formwork technology and the existing market solutions. While we learned valuable lessons, the existing systems were both expensive and designed to be used for concrete (which has different properties to rammed earth). This is why we decided to develop our own formwork system from scratch.

We acquired two essential pieces of equipment at that time: a large horizontal mixer for soil preparation and a pneumatic ramming tool. These tools helped us speed up the building process significantly. In late August, we prepared a concrete foundation for our second rammed earth pavilion.

September: Proving the hypothesis

With increased confidence in our building skills, we still needed a few development cycles to find the best and most efficient formwork design. We needed to find the best solution for the most complex part of our system – the corner module. This is why we planned a new pavilion on the site of our Centre for Building with Earth, composed out of four separate corner elements and an overhanging roof.

In September and early October we built two sets of formwork, which we used to build four corner modules in a series of five workshops. After building each module, we evaluated our process and decided what we wanted to change for the next one. Specifically, we wanted to improve the formwork and make the work faster and easier. By the fourth module, we were fairly satisfied with our formwork and workflow.

We also learned how to deal with failures, as a combination of equipment malfunctioning and insufficient ramming caused what we thought would be our last module to be unstable. So we decided to demolish it and use the same material to build it again, which we did, this time without complications. In early October, the walls of the pavilion were finished.

October: Putting it all together and planning for the future

By mid-October the weather was getting cold and wet, and the building season was drawing to a close. We gathered everything we had done, learned and experienced along the way, and organised a three-part exhibition in our Centre for Building with Earth. The exhibition opened on October 23rd and features:

- Our rammed earth pavilion, showcasing the four basic modules we built and the unique material properties of rammed earth.
- Projects that attendees made at our workshop in July: different examples how our system can be used in practice.
- The Story of Earth exhibition, featuring a series of smaller objects made from rammed earth, which together tell the story of our planet and our relationship with it. From its very beginning to the emergence of humans, our development and the significant effects we have on the Earth. The objects were designed in collaboration with Gašper Fabijan.

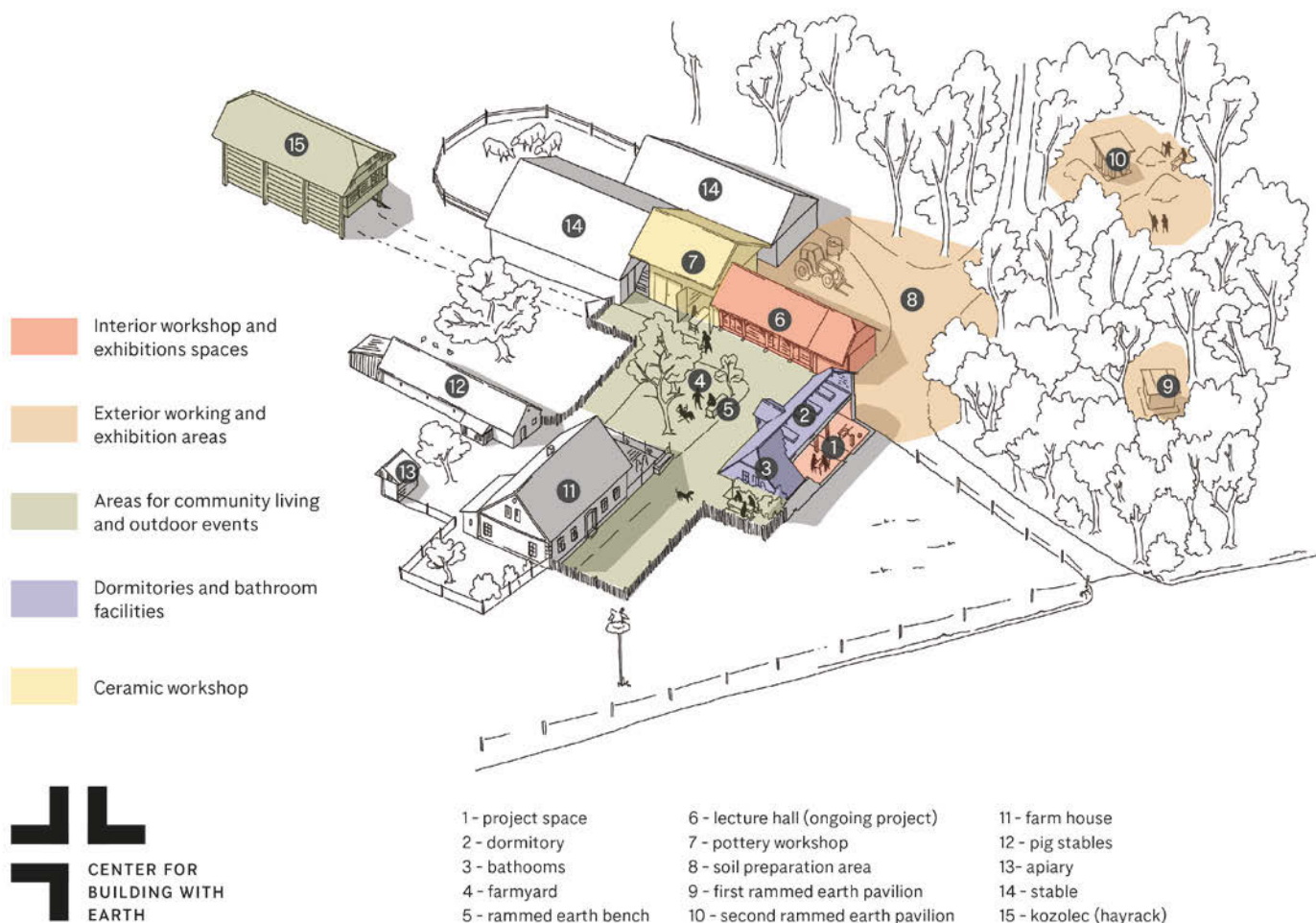
While the active building period of our project is finished, we continue to make plans for future research, development and launching of our product on the market.

Project timeline





Innovation



Testing the construction system through a student workshop

First, we needed to make sure that the models we designed work well as a part of the system. The best way to test this is to develop multiple different types of building typologies. Through the planning process, the scope and possibilities of an architectural idea quickly become apparent, and this may enable new, interesting configurations of space, or create problems that otherwise would not exist.

We decided to organise a one-week international workshop for students of architecture. The workshop had a dual purpose: it enabled us to share and pass along our passion for building with earth to the new generation of architects, and provide them with the necessary information and skills about this material. At the same time, we were able to test the possibilities and limitations of the system we had developed through a short and simple architectural assignment.

A significant factor in our decision to organise the workshop was our reach in both traditional and online media with *Outsider* magazine, as well as our venue, the Centre for Building with Earth. We have already organised a number of successful

workshops there, and it has all the facilities needed for such projects: sleeping quarters, bathrooms and field kitchen.

At the workshop, students were presented with the basic idea of the system we are developing. They were tasked with making a plan of either a single-family home or terraced house using our modular system. They could work alone or in groups, and were encouraged to try and find the flaws in our system and recommend improvements. At first, we encouraged each of them to think broadly and come up with as many ideas as possible, without concern for their quality or feasibility. After discussing this wide variety of options, each student then focused on one particular promising idea and developed it further. We discussed the progress of each project individually or in groups, to answer any questions or help with any dilemmas that arose.

By the end of the week we ended up with a collection of very different ideas and projects, all of them high quality. Each of them put forward a unique way of using the system. Some of them aimed to produce single family homes, others envisioned connected row houses, while some explored the concept of communal living arrangements for individuals or families. Not all the

projects were strictly architectural in nature, and one of the students created a simple computer program which lets users rotate modules and create various basic plans.

In this way, we have proved that the basic idea of the system works.

Rammed earth module – the formwork conundrum

In the summer we contacted several different manufacturers of formwork for concrete constructions. Doka Slovenija, for example, showed us around their factory and explained their formwork technology in detail.

At first we had an idea to use an existing market solution for the formwork, and use it to construct several sets of formwork especially suited for our modules. However, all of the available solutions are designed to be used with concrete. While this means the formwork is very durable and stiff, it also means that it is unwieldy and costly. The basic set of formwork we would need to buy before we started to tweak it to suit our needs proved to be too expensive for our budget.

We thus decided to design and build our own formwork, using standard formwork boards, wooden planks and metal braces. We built two slightly different sets of formwork



and used them to build four corner modules and a rammed earth bench. After building each corner module we evaluated the performance of the formwork, noting the weak points and elements that were difficult to either put together correctly or disassemble. We then attempted to fix these issues when building the next module.

Having built three modules using the same set of formwork, we decided to try a slightly different approach. In the first three instances, the outside wall was fixed and the inside was added on in parts. For the last one, we built a stiff interior corner and four exterior panels which can be moved when needed. This approach results in more rigid and better fitting formwork. While this formwork still needs some further development to be optimally suited for our needs, it fulfils all of our requirements. Specifically, it remains relatively lightweight and can be moved by a pair of workers, and the parts of the formwork are visually very distinct and easily identifiable, so setting it up is very easy. Overall, the formwork for the corner module we designed can be easily adapted for building straight sections and fulfils our expectations as a proof of concept.

Preparing the material and ramming

At the beginning of the project we only had very basic tools to prepare earth mixture and ram it in the formwork. For example, we had to break down lumps of loam and clay by forcing them through a mesh sieve, mix them with sand and a bit of water in a wheelbarrow using a spade, and then ram the mixture using handheld oak and metal rammers. All this took a lot of time and was very physically demanding, so we knew we needed better tools to work faster.

To help us with preparation of the earth mixture, we have acquired a powerful horizontal mixer, which made this process much faster, less physically demanding and produced much more uniform material.

To speed up the process of ramming, we were exploring different possibilities for using a mechanic rammer. As an experiment, we rented a motorised vibrating plate used in road building, and used it to build a rammed earth bench. However, this proved difficult to work with, as it was clumsy and did not compress the earth enough. The best solution proved to be a handheld pneumatic rammer.

The importance of proper tools and attention to procedures became apparent when we were building the final, fourth module of our pavilion. When we had about the third of the module built, the mixer broke down. Because we needed to wait some time for repairs, we decided to continue preparing the earth mixture by hand as best as we could and to continue with the building work. It was very difficult and almost impossible to get a uniform mix, but we persisted. On top of that, some of the layers were not rammed enough. We were able to finish the module – or so we thought – but when we removed the formwork the wall began to lean. This only became more obvious after a few days, so we decided to tear it down and build it again. We used a tractor to demolish a module, then ran the material through the newly repaired mixer and rammed it into the formwork, this time being more careful to achieve and maintain the quality of compression. The finished module is probably the best one we have built so far.

The story of earth: design and art

With Gašper Fabijan, who is a successful designer and architect, we wanted to design a series of smaller objects made from rammed earth. Our initial intention with the series was to offer these objects as pieces of designer furniture or attractive objects you can place in the living room. However, when we were building the first prototypes it became obvious that these objects were just too heavy and unwieldy to be commercially viable if we made them available as a product in an online shop, for example. We decided not to pursue the goal of commercialisation further. But Gašper had prepared some beautiful and inspiring designs that tell a thought-provoking story about Earth's past, present and future. This is why we decided to organise an exhibition of these sculptures (or prototypes) in our Centre for Building with Earth.

Another model for offering these designs to the market, which we might use in the future, is based on workshops – we could organise a paid workshop, where attendees learn about earthen construction, have fun with others and build their own small rammed earth objects which they can then take home.





Impact



Workshops: sharing knowledge and building community

Our workshops were attended by around 40 architecture students and young professionals. Our first and longest workshop in particular had a significant impact on attendees, judging by their testimonies. Some topics came up again and again: beauty (in the nature surrounding us, in the earth we worked with, in us and our relationships), a sense of community (which had formed spontaneously) and creativity (the drive which motivated us to stay up late the final night to finish the project we cared about). As one of the students wrote: “For me, this workshop was one of the best experiences in the field of architecture and urbanism.” Students gained valuable experience in designing and building with earth and formed new friendships. For us, it was amazing to witness a group of very motivated students coming up with a wide variety of different ways of using the system we had not even thought about before.

We gathered all the projects made at this workshop, as well as all the texts the participants wrote, in a booklet titled Architecture and Earth.

Impact on the wider public

During the course of project, we have been constantly promoting our work through our magazine, website and social media. We have published progress photos, reports from workshops and several longer articles, describing our work in detail. Our website has more than 50,000 views per month, which is a significant number of visitors for a Slovenian language platform. We believe our content has been helpful in raising awareness about our project, as well as building with earth and sustainable building practices in general.

What have we built

The physical results of our project are on display in our Centre for Building with Earth. There, the visitors can take a walk in the oak grove on the property and spend some time in two rammed earth pavilions. The first one we built last year, and it showcases all the mistakes that can be made while building with earth, and also all the ways these mistakes can be repaired (which was also part of our research in the project). The second one was built this summer and features four corner rammed earth modules,

covered by a (for now temporary) roof.

In the centre of the farmyard we built a rammed earth bench, which became a popular meeting and resting place for us and workshop attendees. In the interior of the Centre, in the so-called project space, we set up two exhibitions. A display of models and drawings showcasing all the solutions developed by students in summer workshop, and rammed earth art pieces designed by Gašper Fabijan. The exhibitions are open to the public by appointment.

What have we gained

From the beginning of our project until now, we have gained a lot of practical knowledge about building with earth. We have become proficient in all of the stages of the process, because we had both the time and resources needed to test different approaches and techniques. By the end, it took a team of three people only two days to build a corner module from start to finish, which is an immense step forward from a year before, when it took us significantly longer to build a wall, even with more people working. With our current knowledge and resources, we are now ready to implement our solution



on smaller, non-residential projects. We have prepared a sales pitch and marketing strategy, which we will implement in the near future. We hope to build our first commercial project next year.

In this regard, the mentoring offered by Christoph Brosius through the CIRCE programme has been an invaluable help: by questioning our plans and decisions, he helped us to think more about the future plans for our project and how can we establish a position that would best help us with launching our products on the market.

Connecting through CIRCE

Our team creates two magazines: *Outsider*, which is focused on architecture and culture, and the recently launched *El Normal*, dedicated to inspiring entrepreneurial stories. We thus are always on the lookout for fascinating stories of creative people. For this reason, our participation in the CIRCE network has been an especially important networking opportunity.

For example, in the very first issue of *El Normal* we published an inspiring story about Vollpension from Vienna. From the second edition forward, we have been partnered with the magazine *Coconuts* from Belgium – this relationship was formed through workshops at the CIRCE symposium in San Sebastian.

Through our meeting at CIRCE events, we also formed a connection with Myceen from Estonia, who are working on a project in a related field. We are planning further collaboration with them in the form of a research project.

Indirectly, our project enabled us to form a connection with TU Graz, which has a very developed research programme focused on earthen construction. This collaboration will help us with future research and development.

And we hope that the story of our project has benefited and inspired other members of CIRCE community.

20 Aktivnosti v Outsiderjevem centru za gradnjo z zemljo

Izkopano igrišče

Prigrali: Pia Gerbec in Laura Oblak
Foto: Jana Jocič



Gradbišča spominjajo na prostore iztrgane iz konteksta, heterotopije, ki se z zunanjim prostorom povezujejo preko dostavnih kanalov materiala iz sveta onkraj visokih gradbiščnih ograj. Kako je, če situacijo obrnemo? Če namesto v prostoru začnemo graditi z njim? Takrat začne tudi prostor graditi z nami premikanje. Delčki v nas, s katerimi smo prišli na svet, se včasih premaknejo, včasih odpadejo, a jih nadomestijo drugi. Z zemljo gradimo tako, kot odrasčamo – nekaj ostane, nekaj se izgubi, nekaj se zakrpa in popravi. Vsaka faza je človek zase in istočasno opora in temelj za vse tisto, kar še bomo.

ROJSTVO
Kako je zres graditi s prostorom? Biti tam, na kraju, se z njim preleteti – zgraditi, podreti, premeti, narisati, poizkusiti in cel proces ponoviti še enkrat. Vpletenost v prostor se začne že veliko prej, v fazi, za katero vsakič mislimo, da je potreben predvsem papir.

O tem smo se lahko prepričali sami, ko smo v sredini letošnjega poletja v Outsiderjevem centru za gradnjo z zemljo organizirali mednarodno arhitekturno delavnico. Delavnici, ki se, za spremembo, ni v prvi vrsti osredotočala na gradnjo, na butanje, temveč na snovanje in projektiranje objektov iz zemlje. Z zastavljeno nalogo smo sebeli priti borek blizu odgovora na vprašanje »Kako lahko naredimo arhitekturo iz zemlje bolj dostopno?«. Ker je pri tem še vedno naprejša ovira cena, visoka zaradi potrebne količine dela, smo premišljevali o gradnji z modularnimi zemljinimi elementi. Takšna izvedba bi omogočila hitrejšo in lažjo produkcijo, posledično ceneje dostopno in razširjenost tvorste gradnje. To pa je bila tudi edina resna usmeritev projektiranja – kje in kako bi modularne elemente uporabili v gradnji, je bilo prepričljiva razmisleku vsakega izmed udeležencev. Posledično so rezultati zajemali širok nabor predlogov za gradnjo samostojnih ali vrstnih hiš, vežah, še skoraj urbaniščajnih zasnov in ne nazadnje tudi interaktivno spletno 'igro'.

In zakaj je takšno projektiranje drugačno od tistega, običajnega, ki se odvija v pisarnah, na računalniku, brez kontekstnega stika z uporabniki in okoljem? Projektiranje, kot smo ga lahko izkusili na delavnici, omogoča spretno preizkušanje, odmik, ko je potrebno ideo premeti in istočasno prostor za to, da se rodi nova. Med snovanjem smo udeleženci abstraktilno klop iz zemlje, sanirali že obstoječi zid in se preizkusili v tehniki izdelave ploščic raku. Zagotovilo je tak pristop vsaj do neke mere utopičen, v svetlu, kjer je treba projekt izpeljati čim prej za čim nižjo ceno, verjetno res ni prostora in časa za (skupinske) odmake, za napake in popravke. Ker mora biti vse perfektno, nčaj. A kaj je potem tisto, kar bo tam stalo, ko bo 'tadaj' že zdavnaj mimo?

Udeleženci delavnice: Nastja Bojč, Matevž Dražemarič, Pia Gerbec, Nora Holt, Benjamin Kraner, Sašaeta Majercič, Karin Polak, Matevž Bolman, Sinja Tekavec, Maja Zorman

Outsider razširja svoje aktivnosti promocije in raziskovanja gradnje z zemljo s podporno Centrom Impact Research Centre Europe (IRCE) razvijamo modularni sistem, s katerim želimo gradnjo iz dolge zemlje pomeniti in spodbuditi nove, inovativne načine uporabe tega materiala.

The article on our student workshop in Outsider magazine.

POSEL

KDO PEČE NAJBOLJŠE TORTE

Kdo peče najboljše torte? Babica. To je temelj poslovnega modela podjetja Vollpension.

Tekst: Alina Granda
Foto: Mark Glanzer



Na Dunaju si lahko v prijetnem ambientu privoščite torto, ki jo je po lastnem receptu spekla babica – in ki vam kos tudi postreže, skupaj s klepetom. Ideja združevanja generacijski kavarni, ki se je prvič pojavila na dunajskem mesecu obkroževanja leta 2012, se je izredno dobro vključila v mesto in je enajst let neprestano raste, se razvija in prinese k relevantni problematiki starejših. Z čipko ustanoviteljev Vollpension smo se osebno srečali v Berlinu, ko smo sodelovali na simpoziju kreativnih podjetij mreže Circe.

Projekt Vollpension so si zamislili in ga vodijo socialni podjetniki Julia Krenmayr, Moriz Piffl-Percevic in Hannah Lux. »Vsi smo odrasli na podeljevanju stariim starim. Skupno bivanje, delo in prepletanje generacij je bilo za nas nekaj normalnega. Stari so se učili od mladih, mladi od starih – to nas je obkroževalo in ta stik smo v dlanjki velikega mesta Dunaj pogrešali,« povejo.

PROTI REVŠČINI IN OSAMILENOSTI V STAROSTI
Poslanstvo podjetja Generationen-café Vollpension je združevanje in sodelovanje različnih generacij in tako delovati proti revščini in izključenosti v starosti. Odpravljajo srečaliča, kjer se stari in mladi družijo in zabavajo. Do poljva pandemie se je to dogajalo v dveh generacijskih kavarnah na Dunaju – ki še vedno obstajata, ponudbo pa so razširili tudi po spletnih kanalih. Pekovske izdelke in torte po lastnih receptih pripravljajo »ome« in »opi«, ki so na ta način aktivni, v stiku s svojo in mlajšo generacijo – in dodatno zaslužijo.

V prvih desetih letih so v Vollpensionu gostili več kot milijon gostov, postregli več 10.000 kosov peciva, pečenega po receptu babic, pojedli 100.000 tort, predvsem pa spletni trdnogeneracijsko mrežo ter osvetlili in nagovorili temo revščine in osamljenosti starih.

V podjetju Vollpension je zaposleno 15 pisarniška starih in mladih. »Najmlajši zaposleni je star 20 let, najstarejši pa 84. Govorimo o banjavni različnih jenkov, vendar nas to nič ne ovira, da bi se skupaj zabavali. Vsem 80 zaposlenim pa je skupno prizadevanje za medgeneracijsko sodelovanje in zavest o problematiki starih,« se držebe.

Danes je koncept Vollpension bolj aktualen kot kdaj koli prej: po podatkih avstrijskega statističnega urada bo leta 2023 157.000 žensk in 75.000 moških, starejših od 65 let, hudo prizadela revščina in izključenost. Inflacija in visoke cene energije negotiv položaj že zaostregajo: »Če se bo tako nadaljevalo, bo kmalu v revščini živel tako velik delež starejših državljanov, kot je prebivalcev Grčije. Se posebej so prizadete ženske, saj jih veliko živi tik ob ali pod pragom revščine. Vsak evro je pomemben. Ne le finančna, temveč tudi socialna revščina v starosti postala osrednje družbeno vprašanje, ki je od epidemije naprej še bolj očitno,« pravi Julia Krenmayr, direktorica družbe Vollpension, in nadaljuje: »Velike težave vidimo v politiki in davčnih predpisih za starije državljanke, saj so pogosto nižji dodatni zasluzki relativno visoko obdavčeni.«

Med epidemijo, ko so se stiske starih še znatno povečale, pa so morali poiskati nove načine združevanja, kot je na primer spletna šola peke Pekarska akademija, kjer babice in dedki predstavljajo svoje recepte. Nedavno so ponudbo razširili še s spletno trgovino in televizijskim formatu Babičin teleshop. »Format ponuja novo platformo za partnerje naših blagovnih znamk, po drugi strani pa je tudi ekonomsko relevanten in služi našemu cilju ustvarjanja delovnih mest za starije,« pravi Moriz Piffl-Percevic, pobudnik projekta.

ISKANJE INOVATIVNIH REŠEV ZA GOSTINSKO INDUSTRIJO
Poleg pomanjkanja kvalificiranih delavcev se gostinska industrija že več mesecev spopada z naraščajočimi cenami hrane in energije. Podjetje Vollpension je zdaj svoj model časovnega obračunavanja razvilo v tako imenovani »babičin inflacijski pavšal«, da bi svojim strankam kljub naraščajočim cenam zagotovilo dobro razmerje med kakovostjo in ceno. »Razmišljali smo, kako bi kljub dvigu cen ustvarili čim višjo dodano vrednost za naše goste, ki je zaradi velikega dviga cen osnovnih živil in energije nujna za preživetje,« pravi Moriz Piffl-Percevic. »Namesto klasičnega menija smo uvedli pakete s parafinalno ceno.« Jedilnik Vollpension ponuja čas (30, 60, 90 ali 120 minut) in paket, na primer »mali zajtrk ali »kava in torta«. V izbranim obdobju lahko neomejeno uživajte kavo in domačo okolikološko hišno limonado ali leden čaj. Če vam je bil čas prekratek, ga lahko podaljšate v 30-minutnih intervalih. Ta model omogoča varnost pri načrtovanju, saj določa minimalni promet na gosta in sedež.

»V pekarni imamo starije, ki vsako torto in pito pečejo po svojem receptu. To pomeni, da so naši stroški dela in stroški blaga bistveno višji kot pri podjetjih, ki industrijsko pripravljajo velike količine peciva. Ko se cena masla v nekaj tednih nenadoma podvoji, električna stana več kot šestkrat več, moras biti ustvarjalen. Z našim parafinalnim modelom poskušamo najti ravnovesje med pozitivno izkušnjo za stranko in razumno maržo prispevka za nas kot socialno podjetje,« nadaljuje Julia Krenmayr, izvršna direktorica.

IN PRIHODNOST?
Na srečanju mreže Circe v Berlinu so člani projekta Vollpension predstavili načrte za prihodnost: »Koncept medgeneracijske kavarne, spletne trgovine in kuharskih delavnic želimo standardizirati, vzpostaviti franšizo in projekt razširiti v Švice – ter odpreti nove kavarnice po drugih krajih v Avstriji.« Iz Švice so jih namreč povabili k vzpostavitvi podobnega projekta, pri čemer so ugotovili, da morajo svoja dognanja in principe delovanja ubesediti in oblikovati v koncept in zbirko »navodil«.

Problemi starejših – osamljenost, izključenost in slaba politika – so v Sloveniji vsaj tako pereči kot v Avstriji. Poslovni model Vollpensiona deklarirajo, da v sedanjih situaciji to problematiko bolj učinkovito kot birokratski pristopi in obljube rešujejo inovativna podjetja.





The article about Vollpension in the first issue of El Normal.

Learnings





Proof of concept

Our starting hypothesis has been that the archaic and in many ways demanding technology of building with rammed earth can be adapted for use in contemporary architecture using a system of predefined modules, which also makes this way of building simpler and more cost-effective.

Through a student workshop, we have proved that the system we designed is feasible and useful in a variety of different scenarios. Further workshops and construction of multiple modules have proved the feasibility of the module itself, and provided us with valuable experience, which in turn improved the efficiency of our process and sets us up for success in the future development of the project.

Workshops as a method of innovation in creative industries

Analysing the impact and consequences of organising the first workshop in July, it became apparent the positive outcomes in the form of experiences for attendees, the

exchange of knowledge and new findings more than outweigh the resources and efforts needed for organisation.

We suggest that the workshop model can be a great method of aiding the innovation process in the creative industries. Workshops offer benefits for both the attendees and organizer. They provide attendees with new knowledge, experiences and connections. The organizers can also receive valuable information and feedback about the project, which can help in further development. However, it needs to be emphasised that the workshop model is not necessarily appropriate in all cases.

It is important to mention that workshops require a certain infrastructure. We were able to organise a week-long workshop because we had our established Centre for Building with Earth – a physical space with all the necessary amenities, such as sleeping quarters and bathrooms, as well as a diverse set of spaces for working.

Possibilities and limitations of the modular system

Our proposed modular system is very flexible: the set of four modules (three wall modules and one corner) can be used in a wide variety of different configurations for use in both residential buildings and other applications. Modules can be connected, so that the finished result creates the impression of a continuous wall.

However, our system currently has some limitations, which we see as opportunities for future development:

The design of modules means that they need to be built perpendicular to each other, if they are connected. The execution of non-perpendicular connections between modules is possible, but technically very difficult.

While building multiple story structures is possible in theory, more research and practical experiments are needed before we can guarantee the safety of these structures. Massive rammed earth walls have high thermal mass, meaning they decrease



temperature fluctuations indoors, but unfortunately do not have great insulating properties. This presents an issue for building residential houses, if rammed earth walls are placed facing the exterior. In this case, the exterior walls need to be insulated to be in accordance with contemporary standards. Since an important attraction of rammed earth walls is their visual and tactile quality, the development of an insulating solution which will preserve the look of rammed earth on the interior and exterior is necessary. Alternatively, rammed earth walls can be placed in the interior, with walls toward the exterior made from different, complementary materials (such as wooden construction with natural insulation).

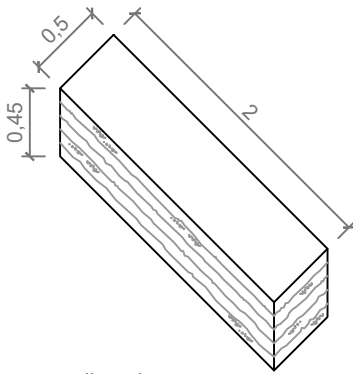
Our plans for the future include the development of a hybrid system, which would include rammed earth modules and different types of complementary modular panels, which would be made with natural materials and provide insulative properties. Such a combination would join the best properties of earthen construction with the flexibility of wood.

The process of building: the importance of developing skills

We have learned a lot about the importance of practical skills in the construction process. With each module we built, our workflow became faster and we became more confident. There were a lot of situations during the process where we needed to develop a feeling for what is right. When is the earthen mixture moist enough? How much ramming is enough, and what is too much? For these reasons, skilled workers will always be an important part of an efficient building process.

Rammed earth modules

Modules we have developed and are capable of building, using our current knowledge and resources.



1. Bench

Rammed earth bench, freestanding or a part of larger design.

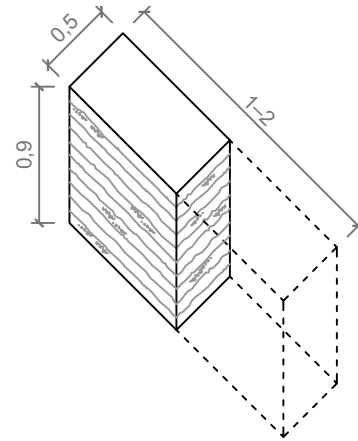
Dimensions: 2 x 0,5 x 0,45 m

Volume: 0,45 m³

Weight: 810 kg

Estimated cost:

1. Earth for ramming: 0–325 € (zero, if material is available on site, 270 if material needs to be bought)
 2. Labor cost: 600 €
 3. Other costs: 100 € (electricity, water ...)
- Total expected cost: 1000 €



2. Counter

Counter top high module for a variety of applications.

Dimensions: 1–2 x 0,5 x 0,9 m (length can be adjusted)

Volume: 0,45–0,9 m³

Weight: 810–1620 kg

Estimated cost:

1. Earth for ramming: 0–650 € (zero, if material is available on site, more if material needs to be bought)
 2. Labor cost: 600–1000 €
 3. Other costs: 200€ (electricity, water ...)
- Total expected cost: 1850 €

3. Wall

A basic building block for larger structures

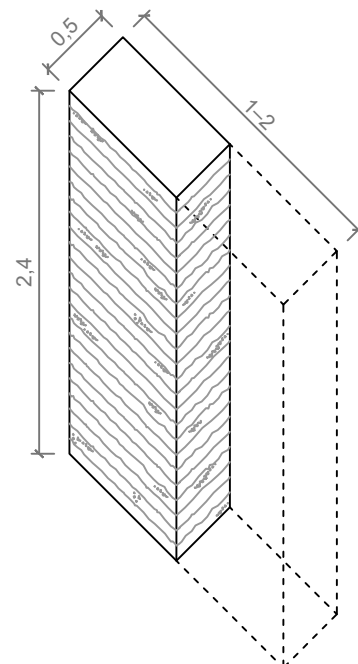
Dimensions: 1–2 x 0,5 x 2,4 m (length and height can be adjusted)

Volume: 1,2–2,4 m³

Weight: 2160–4320 kg

Estimated cost:

1. Earth for ramming: 0–1730 € (zero, if material is available on site, more if material needs to be bought)
 2. Labor cost: 1500–3000 €
 3. Other costs: 400 € (electricity, water ...)
- Total expected cost: 5130 €



4. Corner module

Largest and most important part of our system.

Dimensions: (as shown above, length of walls can be adjusted)

Volume: 1,8–4,2 m³

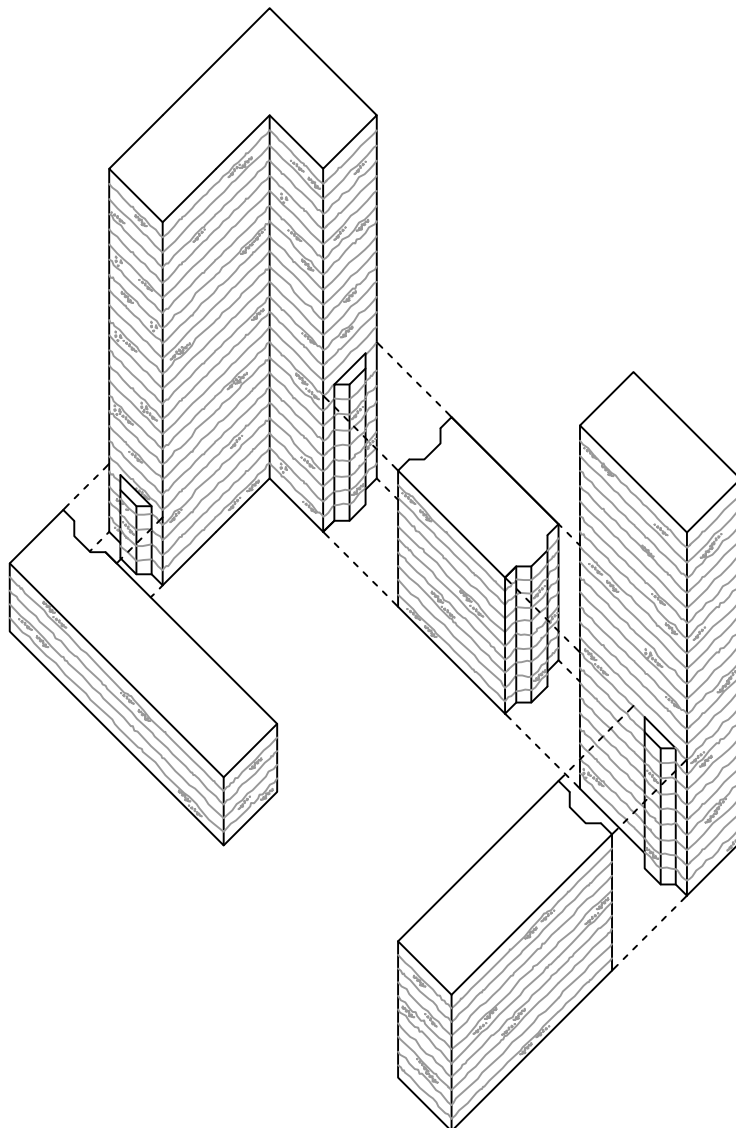
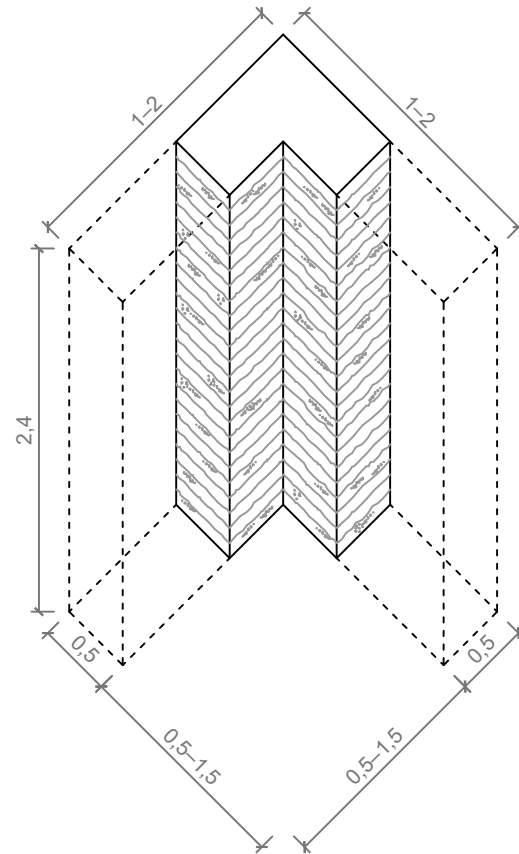
Weight: 3240–7560 kg

Estimated cost:

1. Earth for ramming: 0–3025 € (zero, if material is available on site, more if material needs to be bought)
2. Labor cost: 4000–5000 €
3. Other costs: 700 € (electricity, water...)

Total expected cost: 8725 €

The calculation of total expected cost does not include transport to the location, excavation and foundation, which are expenses, specific to a particular project.

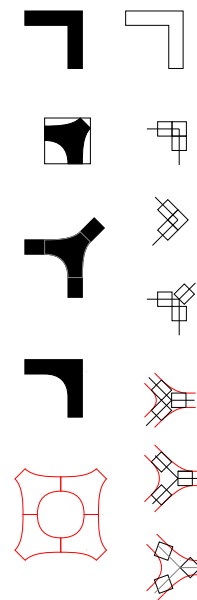
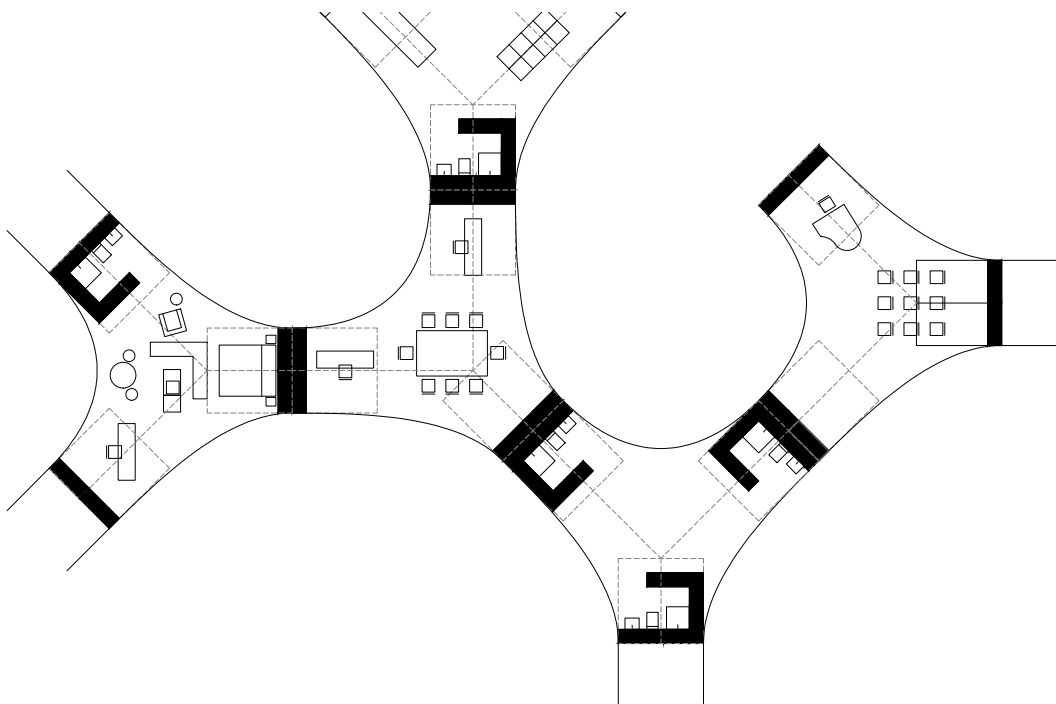


Modules can be joined together in larger compositions. These need to be built one module after another. Secure connections between modules are ensured by a mortise and tenon joint.

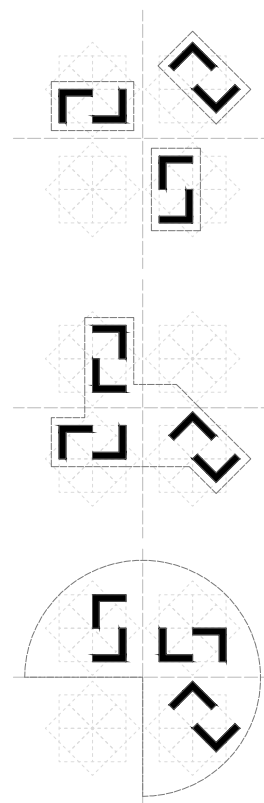
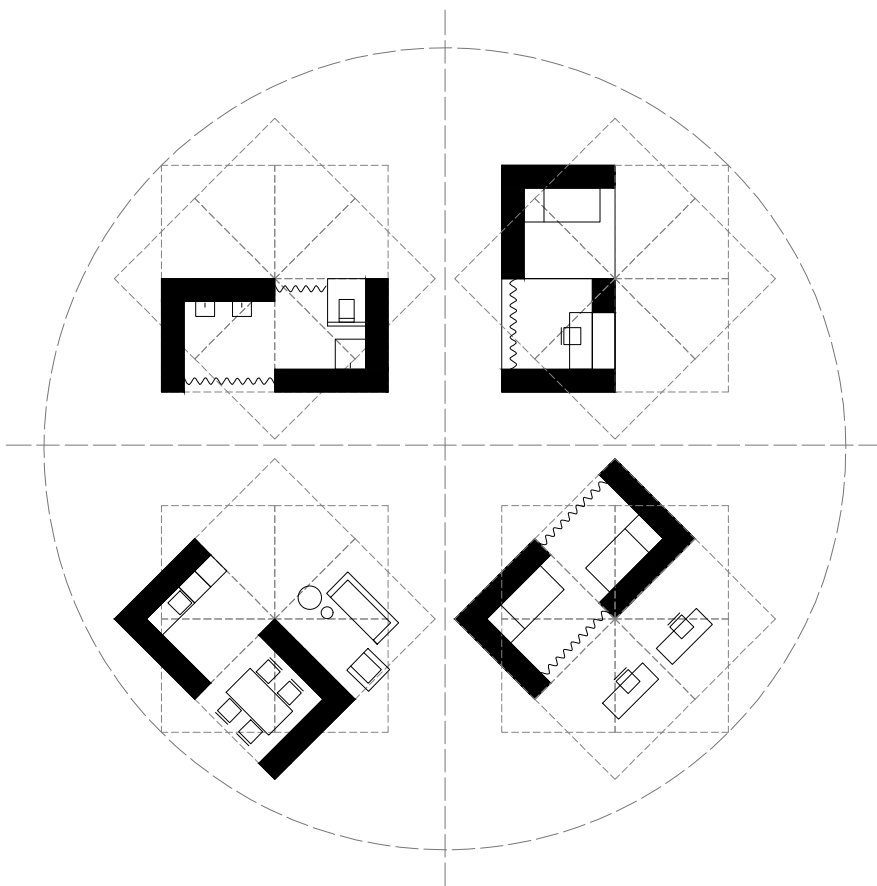
The roof, foundations and other necessary parts of the structure need to be designed separately for each project.

Projects developed using the modular system

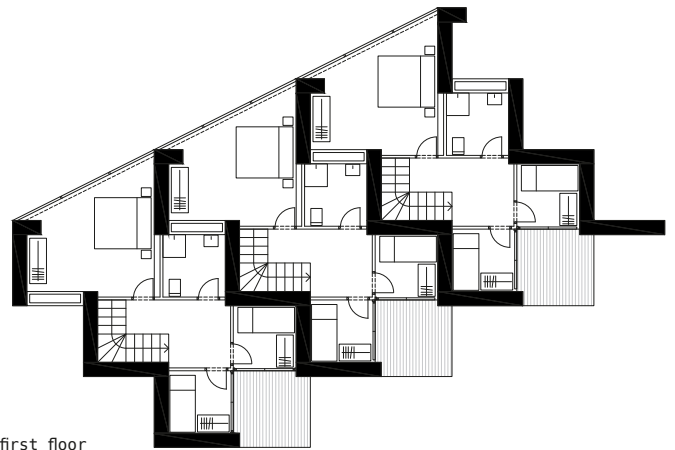
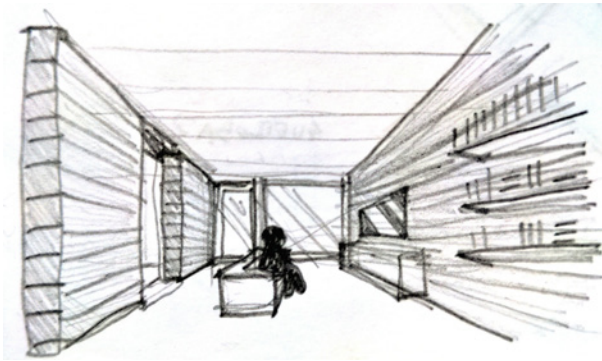
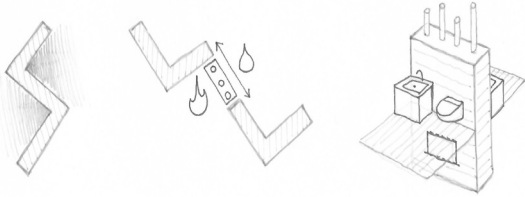
Architectural projects, developed by the students at the international workshop we had organised in July.



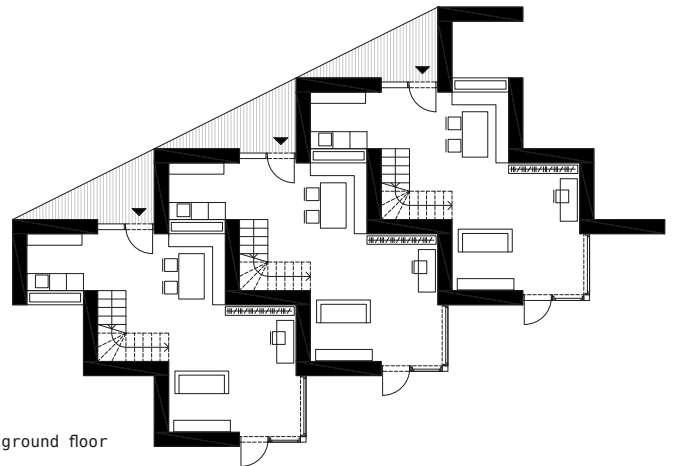
Nora Hoti
EndlessLy



Maks Zorman
Modula Terra



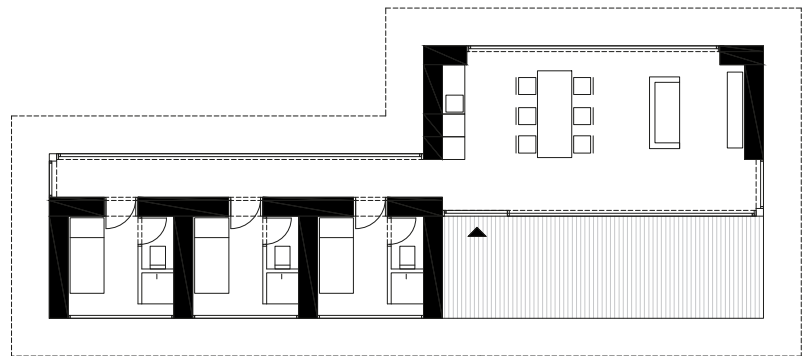
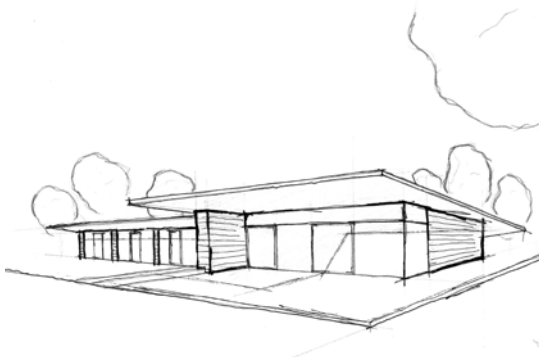
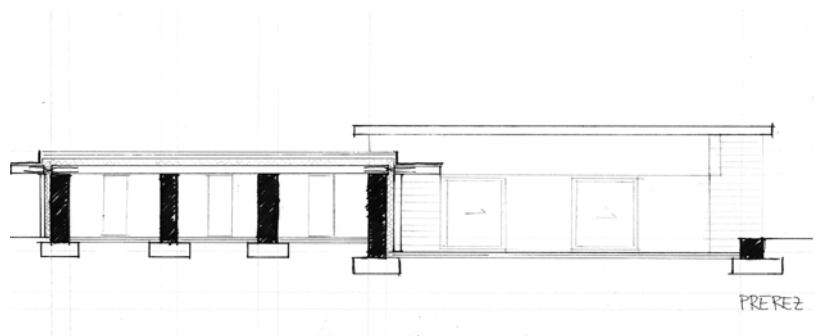
first floor



ground floor

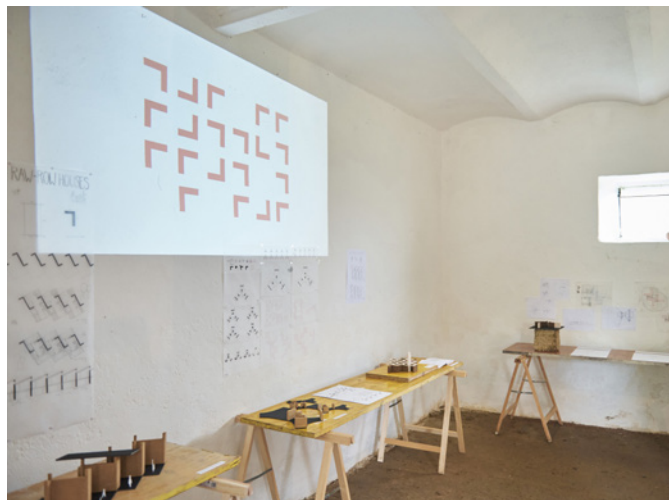
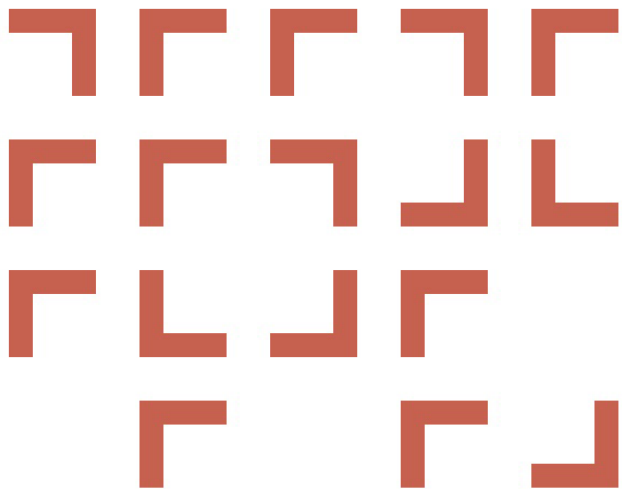
Matevž Dražumerič

Ap - earth - ments

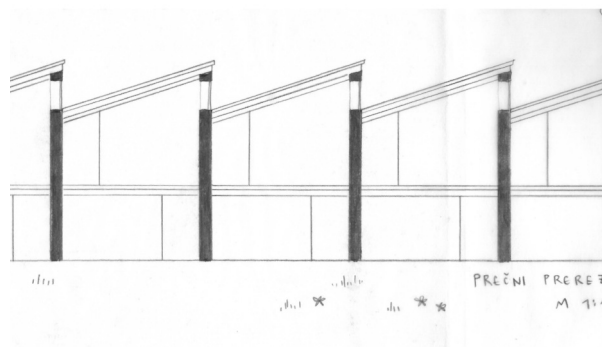
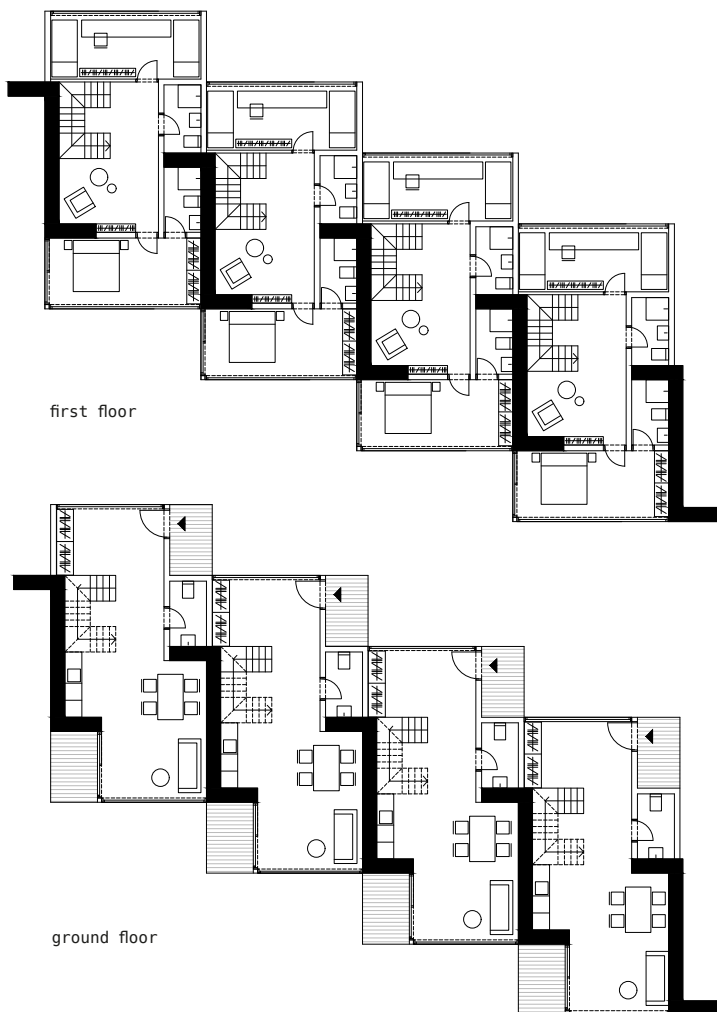


Matevž Rožman

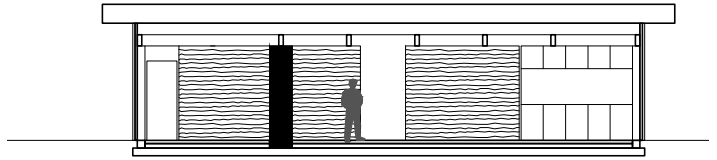
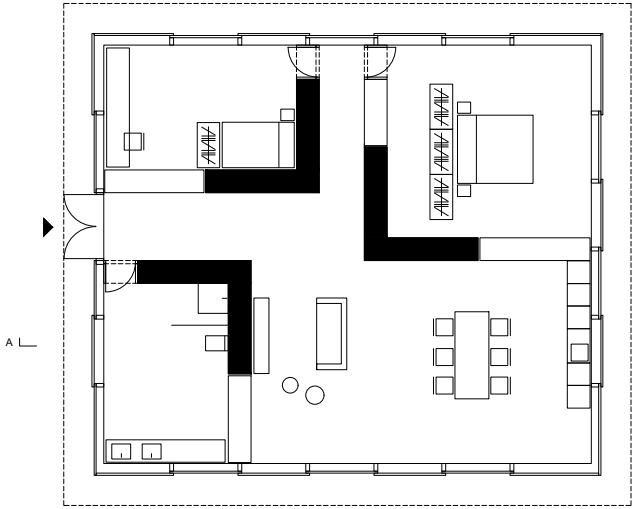
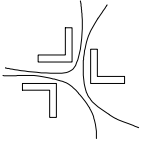
Why on earth are we not building with earth?



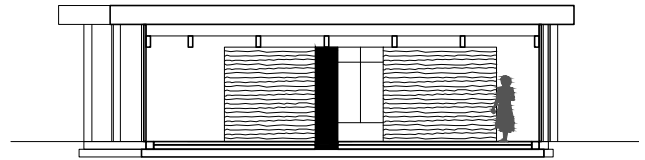
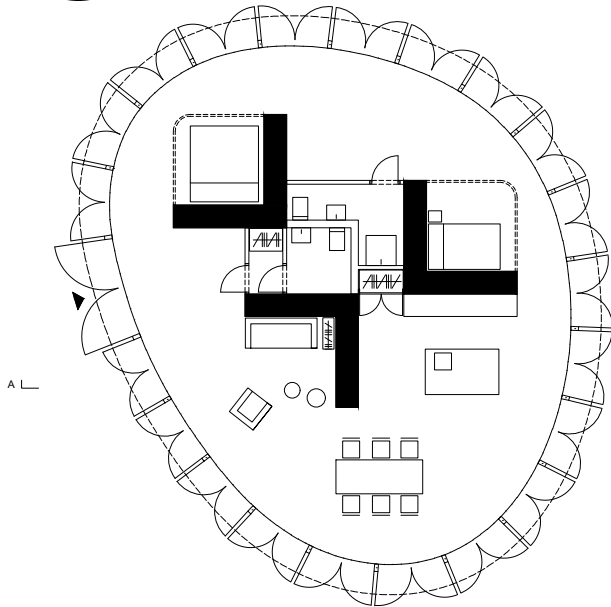
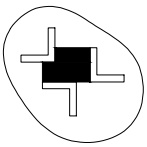
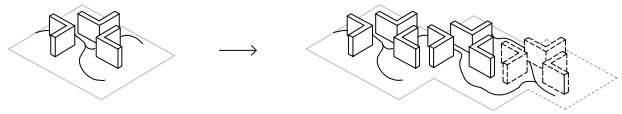
Benjamin Kraner
Rotate tile game



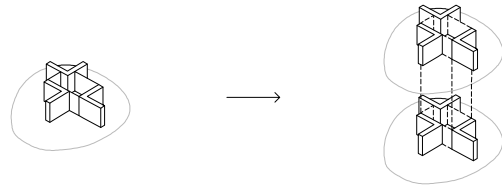
Nastja Bojc
Raw-row houses



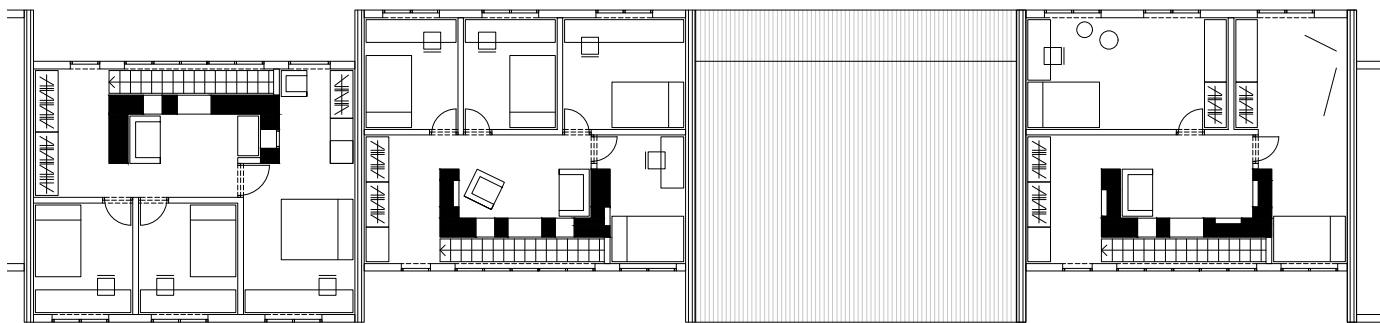
-J-A



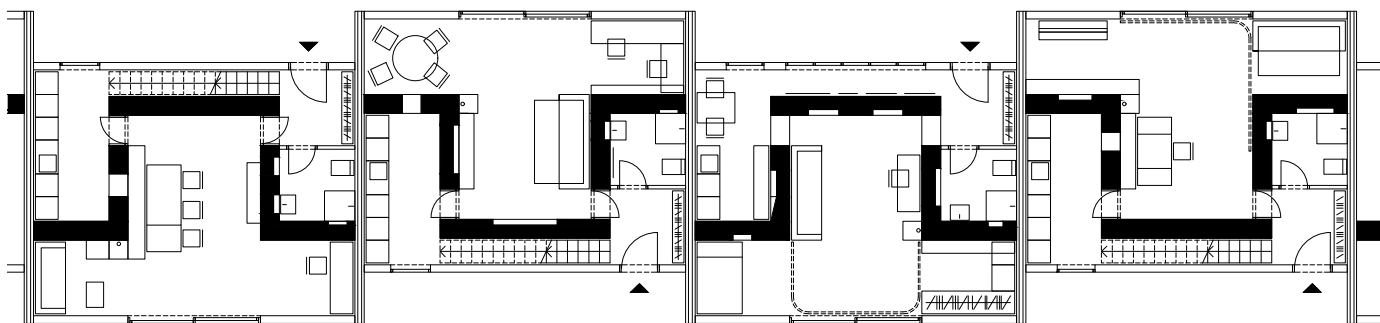
-J-A



Karin Pušnik, Haneta Mujević
Amidst Earth Walls

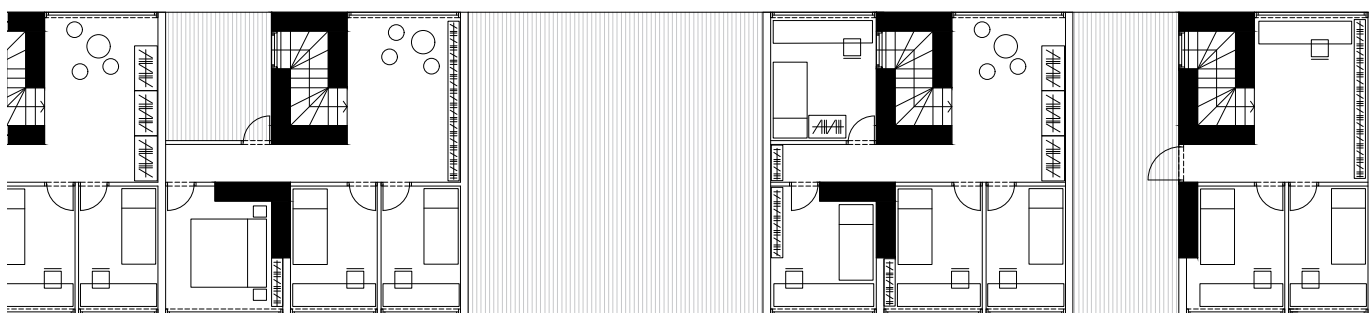


first floor

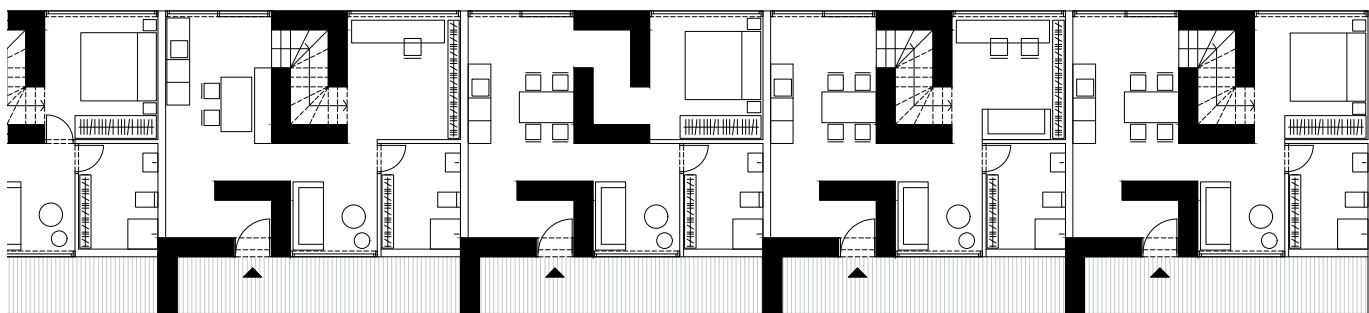


ground floor

Sinja Tekavec
Connected with earth



first floor



ground floor

Pia Gerbec
Valve

A close-up photograph of a weathered wooden beam, likely part of a structure. The wood is dark brown with visible grain and a prominent knot hole. The beam is set against a dark background, possibly a wall or ceiling, with a blurred light source visible in the distance, creating a bokeh effect.

Linking back to
CIRCE



Today, our interconnected world is faced with multiple crises: environmental, political, socio-economic... The creativity which generates new solutions and approaches to societal issues, and explores new ways of being in the world, can be an important driver of societal change. If people strive towards a common goal (such as addressing the global challenges we are facing), creatives can work in very different fields, developing very different approaches and building mutually supportive solutions. Projects within the CIRCE network are an excellent example of this principle.

The relevance of exploring, promoting and adopting sustainable living practices is only becoming greater every year. We believe there are many different approaches towards sustainable living and building. In

many cases these are localised solutions, which address the unique properties of the local environment and its socio-economic situation. Our project highlights only one approach among many. But each such project generates findings that make further work in this field easier.

Overall, one of the findings of our project is that workshops can in certain situations be a powerful tool for raising awareness, educating the public and getting valuable feedback on a developing solution. The connections made with educational institutions are also important and valuable in this regard.

We are very grateful for the approach that U Institut and CIRCE took with regard to supervision of the projects. The framework of our research was very open and enabled

us to have a lot of creative freedom – we were allowed and encouraged to freely explore, innovate, experiment, and even fail. This freedom instilled in us a great sense of responsibility, which has driven us to work even harder and fully take advantage of this opportunity to develop our idea.

CIRCE events, as we have experienced them, have been very inspiring and supportive, offering spaces for exchanging ideas among participants in the CIRCE programme and learning from other attendants and those who have received funds. For us, they were also a great opportunity for self-reflection and thinking about ways to improve our project.

Z. O. P.

Zavod za oblikovanje prostora

Institute for Spatial Design

2023

OUTSIDER

CIRCE Creative Impact
Research Centre
Europe