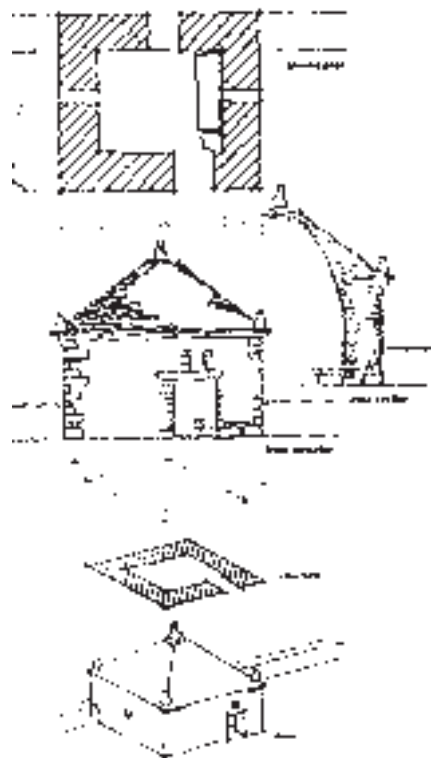
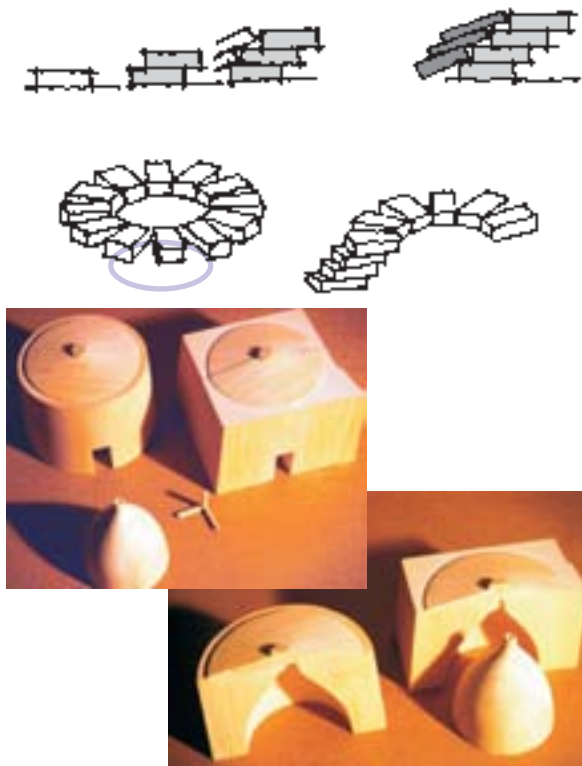


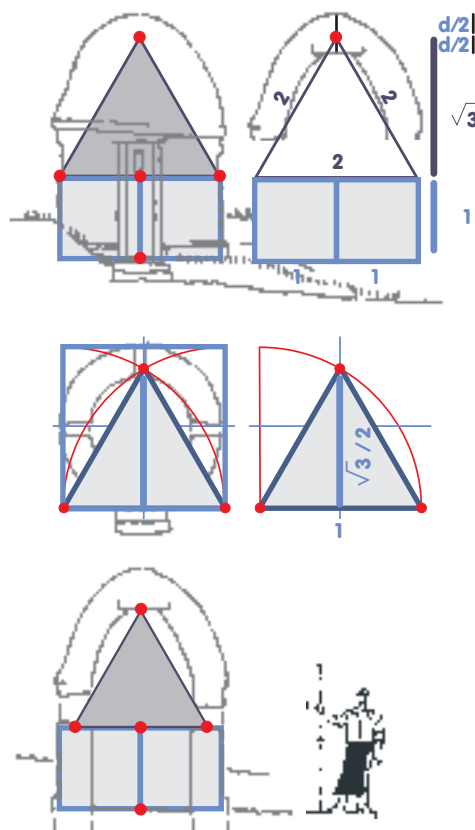
Slika 1: Zgoraj: zbiranje svetlobe za bivanje in vode za pitje v vkopanih hišah (Matmata, Tunizija). Sredina: namerno prepustna streha, ki zbira vodo za vodnjak na Krku. Spodaj: pretočni vodnjak, ki zbira, obnavlja in prepušča odvečne količine vode (Ademuz, Španija). Above: introducing light to living quarters and gathering drinking water in subterranean homes (Matmata, Tunisia). Middle: purposely built porous roof, which allows gathering of rainwater in the well (Krk, Croatia). Bottom: permeable well, which gathers and rejuvenates water and allows removal of excess (Ademuz, Spain).



Slika 2: Kamnita konstrukcija zatočišča: kažun v Istri. Medtem ko so druge konstrukcije le sestavi večjih sistemov, je zatočišče že prava arhitektura. Construction of a stone shelter: kažun in Istria. While other structures are parts of larger systems, the shelter is already real architecture.



Slika 3: Korbelling: v prerezu je to previsevanje, v tlorisu krog. Konstrukcija je iz dveh delov: iz konstruktivnega dela samega in iz oboda, ki služi za protiobtežbo in kot odvajanje vode (krovni material). Zato je notranja konstrukcija vselej enaka, zunanja pa je odvisna od avtorja in je po svetu povsem različna. Corbelling: overhanging in section and circular in layout. The structure is composed of two parts: the load bearing structure itself and the perimeter, which serves as counterweight and for disposal of water (roofing material). This is why the interior structure is always the same, while the external structure depends on its author and varies worldwide.



Slika 4: Weinbergshaeuschen pri Wormsu, Nemčija. Konstrukcija je sestav dveh kvadratov in enakostraničnega trikotnika z višino, ki je enaka korenu iz tri polovic. Weinbergshaeuschen near Worms, Germany. The structure is a composition of two squares and an equilateral triangle, whose height equals the square root of three halves.

## povzetek

**Uvod** govori o kamnu, brez veziva, v tehniki suhega zidu.

**Začetki** segajo nekaj tisoč let nazaj v prazgodovino, megaliti stojijo bodisi posamič, v zidu ali tvorijo zavetje.

**Konstrukcija** korbellinga ali "previsevanja", ko vsaka naslednja plast kamna sega preko spodnje, je ravninska in se kaže v prečnem prerezu. Prerez ima dve plasti: notranjo konstrukcijo in na zunanji okvir, ki služi kot protiobtežba in strešni material. Notranji del je možen le na en način: na zunanji jih je množica.

**Tipika, značilnosti in posebnosti** so elementi zidu in prostorskih konstrukcij. Značilnost je enotna notranja nosilna konstrukcija, ki izhaja iz kroga v tlorisu in iz trikotnika v prerezu.

**Teorija** kaže na enotnost konstrukcije in na raznolikost zunanjih oblik. V prerezu je neizogiben enakostranični trikotnik. Višina takega trikotnika je koren iz tri polovic, a jo je mogoče sestaviti iz treh enako dolgih palic, ki so tudi igračka pastirjev. Konstrukcija korbellinga je stara preko šest tisoč let: Hypogeum na Malti ga kaže v vklesanem kamnu podzemnega svetišča iz četrtega tisočletja pred štetjem.

**Možnosti** konstrukcij v kamnu brez veziva se začnejo z zidom. Kot arhitektura so nedvomno najbolj zanimiva zatočišča, ki stoje od Škotske do Palestine, od Španije do Grčije, verjetno pa jih najdemo še marsikje. Zatočišča so lahko velika le za steklenico in kruh ali pa za čredo konjev: razlike so pri tem izjemne.

**Problematika** včerajšnjega dne je bila nuja. Problematika danes je v vse manjši uporabi in s tem v manjši pomembnosti. Objekti so potrebni občasne nege in na koncu svojega ciklusa tudi obnovo, vmes pa zaščito: tako po zakonu kot fizično. Tukaj pa se odpirajo povsem drugi problemi, vezani z lastništvom, uporabo in s kulturo. Zato je danes najpomembnejše odkrivanje teh konstrukcij, njihovo dokumentiranje, analiziranje, dvig vedenja o pomembnosti, osveščanje ljudi in prikaz problematike javnosti, tako s publiciranjem kot z organizacijo obiskovanja.

## doseženi cilji, namen in rezultati

Namen naloge je bil pregled vseh konstrukcij v tehniki suhega kamna. Cilj, ki je dosežen, je pregled niza zanimivih in ponekod presenečujočih kompozicij (na primer stadion za korido, most ali akvedukt, past za volkove), s poudarkom na kamnitih zatočiščih. Rezultat je dokaz, da je konstrukcijski princip korbellinga, znan vsaj šest tisoč let, še vedno živ in še vedno aktualen.

## problematika v arhitekturi, umestitev obravnavane teme v te tokove in njen pomen

Problematika izvora in razvoja, ki vodi v visoko arhitekturo, je za današnje razumevanje ključnega pomena. Dokaz uporabe zahtevnih matematičnih elementov (zahtevnih za neukega graditelja, ki je te elemente vnašal v konstrukcije z redom, a s preprostimi orodji) je obstoj te arhitekture tudi danes.

## ključne besede

kamen, tehnika suhega zidu, konstrukcija, korbelling, kompozicija, kamnito zatočišče

## summary

*The introduction deals with stone, built in the dry-wall technique, without bonds.*

*The beginning reaches to prehistoric times several millennia ago, megaliths stand alone, in a wall or form shelters.*

*The corbelling structure or "overhanging", when each consecutive layer of stone reaches beyond the lower one, is planar and can be seen in the cross-section. with two layers: the load-bearing structure and outer frame as a counterbalance.*

*Type, characteristics and particularities are elements of the wall and spatial structure. The uniform internal load-bearing structure is characteristic by circular layout and triangle.*

*Theory points out uniformity of structure and variety of external form. The equilateral triangular section is inevitable. The triangle's height is square root of three halves, but it can be assembled from three sticks of equal length, like a game played by shepherds. Corbelling is a structure known for more than six thousand years (Hypogeum on Malta from 4000 BC).*

*Possibilities for building structures in stone without bonds begin with the wall. From the architectural aspect, the most interesting structures are undoubtedly shelters standing from Scotland to Palestine, Spain to Greece and can probably also be found elsewhere as well. Shelters were built for just a bottle, a loaf of bread or a herd of horses: differences are immense.*

*Yesterday's issue was necessity. The present issue is diminished use and thus diminished significance. Buildings need occasional care, towards the end of their lifecycle also renewal and in between protection: both by law and physically. Herewith completely new issues tied to property, use and culture emerge. Therefore, today's most important task is discovering these structures, documenting and analysing them, increasing awareness about their significance, raising consciousness and presenting the issue to the public, both by publishing and organising visits.*

## intentions, goals and results

*The intention of the research was to review all structures built in the dry-wall technique. The achieved goal is a review of many interesting and sometimes surprising compositions (for example a bull-fighting stadium, bridge or aqueduct, wolf trap), the emphasis being on stone shelters. The result proves that the principle of corbelling as a structure has been known for at least six thousand years, it is still alive and still contemporary.*

## architectural issues, positioning the topic in ongoing debate and its' significance

*Issues about sources and developments leading to high architecture are of key importance for contemporary understanding. Proof of use of complex mathematical elements (complex for the simple builder, who introduced these elements to structures as an order, but with simple tools) is the existence of such architecture even today.*

## key words

stone, dry-wall technique, structure, corbelling, composition, stone shelter