Clay mortars in
compressed earth masonry

Experimental insights into buildability, material flows and regenerative lime additives

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Introduction
Experimental studies on clay brick masonry

Compressed clay bricks are increasingly considered a low-impact alternative in sustainable construction. Their use aligns with ecological principles of low embodied energy, local resource availability, and recyclability (Hoube, H & Guillaud, 1992); (UNCHS, 1992). However, the performance of clay mortar—especially with lime additives—remains underexplored in contemporary research and practice.

This paper presents an applied research project conducted within Zealand's architectural technology programme, combining empirical testing with a systematic literature review to advance knowledge on clay-based construction. The study responds to growing interest in integrating traditional materials into contemporary construction, particularly in relation to climate adaptation and circular economy principles (Hanak, C. et al, 2025; Vindrosen, 1993b).

Historically, clay has been used globally for over 10,000 years, with more than one-third of the world's population still living in clay-based dwellings (p. 11). Major structures such as temples in Luxor were built with unburnt clay (El-Shafie, 2022). In Denmark, clay construction was widespread until the mid-20th century, with renewed interest emerging through pilot projects like Saltoftevænge (Vindrosen, 1993, p. 5).

Lime plays a critical role in enhancing clay's performance. Through pozzolanic reactions, lime improves water resistance, cohesion, and long-term durability (UNCHS, 1992, pp. 26–28). Lime renders and mortars are breathable, flexible, and compatible with clay substrates, avoiding the brittleness of cement-based alternatives (Vindrosen, 1993).

By integrating traditional clay techniques with innovative lime additives and international benchmarks, this study contributes to the scientific, cultural, and practical discourse on clay as a contemporary building material. It supports the development of standards and educational frameworks for earth construction and strengthens sustainability competencies among emerging professionals.

Methods
The experimental study was conducted within the framework of Zealand's architectural technology programme. Eight test walls were constructed using compressed earth bricks in stretcher and block bonds. Four mortar compositions were examined:
— Pure clay mortar[i]
— Clay mortar with Rødvig Kulekalk, årgang 2018[ii]
— Clay mortar with Jurakalk[iii]
— Clay mortar with Norwegian oyster shell lime (derived from invasive Pacific oysters)[iv]

Appendices 1 and 2 present the underlying data supporting the experimental setup, including material compositions, mixing methods, and observational notes.

All mortars were prepared in accordance with established mixing ratios and applied under controlled indoor conditions, see apendix. The walls were monitored over eight weeks. Crack patterns, joint stability, and drying behavior were documented through visual inspection and photographic registration. IoT sensors were installed to monitor temperature and humidity; however, due to incorrect software configuration, no valid microclimatic data were obtained. The room remained frost-free throughout the observation period, and no supplementary moisture measurements were conducted.

Further details of the experimental procedure are provided in the appendix, including construction sketches, material specifications, and student logs. Students from Zealand's architectural technology program played a central role in executing the experiment. Their contributions included:

- Mixing and applying mortar
- Constructing test walls
- Conducting visual inspections
- Documenting results photographically
- Performing a systematic literature review

This dual approach—hands-on experimentation and academic review—strengthens the methodological foundation and supports the study's relevance to education and applied research. As emphasized in a Danish guidance 'Lerjord som byggemateriale' (BUR), a practical engagement with material behavior is essential for understanding clay's performance in construction contexts (Vindrosen, 1993, pp. 18–21). UNCHS similarly highlights the value of combining empirical testing with contextual knowledge in earth construction (UNCHS, 1992, pp. 35–38).

Results

Across all test setups, the pure clay mortar exhibited the strongest cohesion and the least cracking. This supports existing literature, which emphasises the inherent plasticity and binding capacity of unstabilised clay when properly prepared and applied (Vindrosen, 1993b, pp. 18–22).

The lime-modified mortars showed variable performance: Rødvig Kulekalk and Jurakalk improved workability and ease of application, but both exhibited moderate shinkage-related cracking during the drying phase. This aligns with Vindrosen who notes that lime additives can increase flexibility but may also introduce shrinkage, if not properly balanced (pp. 75-83). The *Rødvig Kulekalk* used is a white lime putty composed of calcium hydroxide ($Ca(OH)_2$). Unlike hydraulic lime, it hardens through carbonation — a process in which it absorbs carbon dioxide (CO_2) from the air. *Rødvig Jurakalk* is a pure dry lime produced from a naturally clay-rich limestone. The limestone is quarried in open pits, then crushed and fired in a rotary kiln at approximately 1000°C. The resulting quicklime is slaked and ground into a fine dry powder. This powder constitutes the active substance — natural hydraulic lime — which sets upon the addition of water, making it ideal for applications requiring early strength and durability.

The *oyster shell lime* used in this study was produced from invasive Pacific oysters collected on the west coast of Norway and burned in a traditional batch kiln using wood fuel (Construction Materials Consultants Ltd., 2021a, pp. 4–6). Laboratory analysis (XRD/XRF) classified the binder as a non-hydraulic air lime (CL90) with a CaO content of approximately 54% and only trace hydraulic phases (Belite ≤ 1.5%), resulting in a hydraulicity index of 0.01 (p.5). This means the material hardens exclusively by carbonation rather than hydraulic reactions. Mortar samples prepared with this lime were characterised by high porosity (28.7–38.2%) and low compressive strength (0.40–0.69 MPa) even after extended curing (p. 8), which is consistent with the behaviour of air lime mortars. These findings are central to the interpretation of the experiment: the observed shrinkage and slow strength development reflect the inherent characteristics of a pure air lime system and should not necessarily be regarded as indicative of flaws in the experimental setup.

Table 1

Experiment 01 /Forsøg 01		100% Energiens Hus's own clay mortar (LKN) *100% Energiens Hus 'egen lermørten' (LKN)*
Experiment 02 /Forsøg 02		Rødvig Kulekalk årgang 2018, 2% fra KALK *Rødvig Kulekalk, 2018, 2% from KALK*
Experiment 03 /Forsøg 03		Rødvig Jurakalk, 2% fra KALK *Rødvig Jura lime, 2% from KALK*
Experiment 04 /Forsøg 04		Østerskalk + 2% *Oyster shell lime + 2%*
Experiment 05 /Forsøg 05		100% Energiens Hus 'egen lermørten' (LKN) *100% Energiens Hus's own clay mortar (LKN)*
Experiment 06 /Forsøg 06		Rødvig Kulekalk årgang 2018, 2% fra KALK *Rødvig Kulekalk, vintage 2018, 2% from KALK*
Experiment 07 /Forsøg 07		Rødvig Jurakalk, 2% fra KALK *Rødvig Jura lime, 2% from KALK*
Experiment 08 /Forsøg 08		Østerskalk 2% *Oyster shell lime 2%*

This approach reflects a broader shift toward bio-based material flows in regenerative architecture, where waste from marine ecosystems can be recontextualized as a resource. The experiment thus contributes not only to technical evaluation of mortar performance, but also to the discourse on ecological material sourcing and the potential of decentralized, low-carbon supply chains in earthen construction.

Quantitative data from IoT sensors not indicated temperature, due to incorrect software installation, no valid temperature or moisture data were recorded. The room remained frost-free throughout the observation period, and no supplementary moisture measurements were conducted.

Several test platforms were unintentionally moved during the experiment, complicating the interpretation of joint displacement. It remains unclear whether observed shifts were due to mortar failure or physical relocation. This limitation highlights the need for stricter control of test conditions in future studies (UNCHS, 1992, p. 38).

Photographic documentation revealed that joints constructed with pure clay mortar retained their form better over time. In execution, challenges with consistency in mixing and application, particularly in early stages. Variations in joint thickness and drying behavior were observed across mortar types, underscoring the importance of precise material preparation and application techniques (Vindrosen, 1993b, pp. 90–91)

Discussion

The results collectively indicate that the pure clay joints performed most stably, exhibiting the fewest cracks and the best shape retention during drying. This aligns with literature emphasising that well-graded, properly prepared clay can achieve high cohesion and plasticity without chemical stabilizers—provided that grain-size distribution, water content, and workmanship are appropriately tuned (UNCHS, 1992); (Vindrosen, 1993b, pp. 18–22).

The superior performance observed here can likely be attributed to a favorable balance between the fine clay fractions (which provide binding) and sand/silt (which limit shrinkage), combined with a relatively controlled drying regime without frost exposure. The literature further notes that shrinkage cracking in earthen mortars is primarily governed by water content, grading curve, and drying conditions (UNCHS, 1992, pp. 26–28).

The lime-modified mixes improved workability but also exhibited moderate cracking during the drying phase. This ambivalence is well documented: lime can increase plasticity and early cohesion while altering porosity and capillary water transport, which—depending on dosage, particle size, and the kinetics of carbonation—may exacerbate shrinkage or delay uniform drying (UNCHS, 1992). For Rødvig Kulekalk and Jurakalk, the gains in handling did not fully offset drying challenges under the specific compositions and application conditions used.

This suggests the need to further tune the sand/clay ratio and the effective water-to-binder proportion when lime is added, as recommended in the earthen construction literature. Adjustments in lift thickness, pre-wetting of bricks, and curing under controlled humidity conditions may also mitigate shrinkage.

The oyster shell lime stands out for good adhesion and even drying behaviour despite its non-hydraulic character. Its sourcing from invasive Pacific oysters introduces a regenerative material stream that aligns with circular economy principles—not merely in terms of waste valorisation, but through the integration of biogenic calcium sources into construction practice. Unlike industrial lime, which typically relies on mined limestone and energy-intensive calcination, the use of oyster shells represents a biologically derived, low-impact alternative that simultaneously addresses ecological overpopulation and material scarcity.

This approach reflects a broader shift toward bio-based material flows in regenerative architecture, where waste from marine ecosystems can be recontextualized as a resource. The experiment thus contributes not only to technical evaluation of mortar performance, but also to the discourse on ecological material sourcing and the potential of decentralized, low-carbon supply chains in earthen construction

Mechanistically, its performance may stem from a fine particle size and high purity across the $CaCO_3/CaO/Ca(OH)_2$ fractions which, with proper slaking and subsequent carbonation, can yield a coherent matrix without excessive shrinkage. XRD and XRF analyses confirmed the presence of trace hydraulic components (Belite) and silicate minerals, though in quantities too low to impart measurable hydraulicity (Construction Materials Consultants Ltd., 2021a).

Methodologically, the study presents three salient limitations. *First*, IoT sensor data were not usable due to software setup issues; consequently, a quantitative link between microclimate and crack development/drying progress is missing. This weakens causal inference and necessitates reliance on qualitative observations (UNCHS, 1992, p. 38). *Second*, some test platforms were unintentionally relocated during the eight-week period, obscuring the distinction between actual joint displacement and inadvertent physical repositioning. This well-documented source of measurement error poses a risk to internal validity and underscores the importance of secure fixture and systematic documentation of all handling procedures. *Third*, variations in execution among the team contributed to differences in mix consistency, joint thickness, and compaction. Rather than being a methodological limitation, this diversity reflects the realities of craft-based construction and enhances ecological validity. Moreover, the pedagogical approach—emphasizing experiential learning—provided valuable insights into material behaviour under authentic conditions, aligning with educational goals and practice-oriented research (Vindrosen, 1993, pp. 12–15)

The implications are twofold. In practice, the findings suggest that well-tuned pure clay can be a robust, low-emission option for joints in specific applications, whereas lime additions should be optimized with careful attention to grading, water content, and controlled curing/carbonation. Straightforward adjustments—pre-wetting absorbent bricks, thinner lift thicknesses, drying, and targeted fiber or sand tuning—can mitigate shrinkage (UNCHS, 1992) (Vindrosen, 1993).

For research and education, the case underscores the value of combining hands-on trials with systematic literature review: practice-based learning deepens conceptual understanding of material flows and drying dynamics, as highlighted by both Vindrosen (Vindrosen, 1993, pp. 87–90) and UNCHS (1992, pp. 35–38). For future studies, we recommend:

(1) Validated data loggers with calibrated T/RH (and optionally base or masonry moisture probes),
(2) Mechanical and hygrothermal testing according to standardized methods (e.g., compressive/flexural strength, capillary absorption, water vapor diffusion, time-dependent shrinkage),

(3) Digital image correlation or LVDTs to quantify joint movements,
(4) Sufficient replicates per mortar type, and
(5) Systematic linkage of XRD/XRF results to observed crack patterns (Construction Materials Consultants Ltd., 2021a) (Construction Materials Consultants Ltd., 2021b).

Such a setup will strengthen internal validity and enable more precise comparisons among stabilization strategies (UNCHS, 1992; Vindrosen, 1993).

Overall, the experiment supports the view that material understanding in earth and clay construction is best grounded in the interplay of craftsmanship, systematic observation, and theoretical framing—with clear benefits for applied research and education (UNCHS, 1992; Vindrosen, 1993).

Conclusion

This study confirms that pure clay mortar, when properly prepared and applied, offers superior cohesion and crack resistance compared to lime-modified variants under controlled indoor conditions. Lime additions improved workability but introduced drying-related challenges, particularly shrinkage and cracking, which require further refinement of mix design and curing strategies (UNCHS, 1992).

Among the lime variants, oyster shell lime showed promising results. Derived from invasive Pacific oysters and burned in low-tech, wood-fired kilns, this material represents a regenerative alternative to conventional lime. XRD and XRF analyses confirmed the presence of trace hydraulic components (Belite) and silicate minerals, though in quantities too low to impart measurable hydraulicity (Construction Materials Consultants Ltd., 2021a). Mortar samples made with oyster shell lime demonstrated good adhesion and drying behaviour.

This regenerative material stream illustrates how bio-based resources—originating from ecological surplus—can be recontextualized as functional building materials. Rather than treating marine overproduction as waste, the approach reframes it as a low-carbon input in sustainable construction. This aligns with broader efforts in regenerative architecture to integrate ecological cycles into material sourcing and design (UNCHS, 1992)

The study's limitations include the absence of validated hygrothermal data due to sensor failure, minor inconsistencies in execution, and physical displacement of test platforms. These factors restrict the depth of quantitative interpretation but do not diminish the applied value of the experiment. The combination of empirical testing and literature review proved effective for education, reinforcing the importance of hands-on engagement in understanding material behavior (Vindrosen, 1993).

Future research should incorporate calibrated environmental monitoring, standardized mechanical and hygrothermal testing, and advanced displacement tracking to strengthen internal validity and enable comparative analysis across stabilization strategies. In particular, further investigation into the carbonation kinetics and pore structure of oyster shell lime mortars may clarify their long-term performance and compatibility with clay substrates.

Acknowledgements

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Apendix A

Dato	Produkt /forsøgsnummer	Format L x B x H	Lermørtel	Materialer	Metode	Type forbandt og fuge	Datablad eller analyse (links)	epd	Temperatur	Noter
14. november 2024	Forsøg 01 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2024	300x145x90	100% Energiens Hus 'egen lermørtel' (LKN)	3 L lermørtel - til 2 sand Lerpulver og postevand (LKN)	Blandes vha. tvangsblander Vi lægger mørtel ud i en lang stribe på en palle af plastic. De store sten limes normal for bag side på lersten	Løberforbandt/klæbes	Se note [2]. Lerjord fra Nærheden.	NEJ		Lermørtel tørrer ikke på samme måde som kalkmørtel
14. november 2024	Forsøg 02 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2025	300x145x90	Rødvig Kulekalk årgang 2018, 2% fra KALK	3 L lermørtel + 140g kulekalk	Blandes vha. rørværk	Løberforbandt/klæbes	https://renovering.kalk.dk/wp-content/uploads/2024/08/Roedvig_Kulekalk_Final_gdd_190824.pdf http://renovering.kalk.dk/wp-	https://renovering.kalk.dk/wp-content/uploads/2023/11/md-23029-en_rev1-1.pdf		
14. november 2024	Forsøg 03 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2026	300x145x90	Rødvig Jurakalk, 2% fra KALK	3 L lermørtel + 145g jurakalk	Blandes vha. rørværk	Løberforbandt/klæbes	http://renovering.kalk.dk/wp-content/uploads/2022/05/R%C3%B8dvig_Jurakalk_final_gdd.pdf http://renovering.kalk.dk/wp-	https://renovering.kalk.dk/wp-content/uploads/2023/11/md-23029-en_rev1-1.pdf		
25. november 2024	**Forsøg 04** Komprimeret lersten (EVO) Nr. 20 Sten 21/10 2027	300x145x90	Østerskalk + 2%	4000 gram lerpulver 80 g østerskalk + 1,5 dl sand [illegible] Se note	Materialer vejes op på vægten. Kalken pakkes ud, og er indpakket i stanniol. Stanniol er delvist opløst, og børst bort så godt det nu som kunne lade sig gøre. Kalken udrøres i hånden med 1,5 dl vand. Tilføj lerpulver og mere vand. [illegible]	Løberforbandt/klæbes	Se note [3] Cert of Test & Analysis - M208536-C1 - Norwegian Oyster Shell Lime Mortar (1) Cert of Test & Analysis - M208520-C1 rev1 Norwegian Oyster Shell & Oyster Shell Specimo (2).pdf	NEJ		
14. november 2024	Forsøg 05 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2028	300x145x90	100% Energiens Hus 'egen lermørtel' (LKN)	Afm lermørtel 1 ler til 2 sand - I realiteten 1:4 pga beskaffenheden af moræneler	Vi lægger mørtel ud i en lang stribe på en palle af plastic, og derefter opmuring. Fuge checkes vha. målestok. Fuge trykkes således mørtelfuge er ca. 12 mm. Udfordringer med at nederste fuge 'trykkes' ned og mindre end 12mm	Løberforbandt/Skrabefuge 12mm	Se note [2]. Lerjord fra Nærheden.	NEJ		
14. november 2024	Forsøg 06 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2029	300x145x90	Rødvig Kulekalk årgang 2018, 2% fra KALK	Lermørtel tilsat Rødvig kulekalk årgang 2018 5 l færdig blandet ler kg 10.75 kg 5 l vådt er tilsvarende ca. 7kg tørt 20 l færdigt ler - 855 gram rødvig kulekalk	Blandes vha rørværk og derefter opmuring udført på en palle af plastic Vi lægger mørtel ud i en lang stribe på en palle af plastic, og derefter opmuring. Fuge checkes vha. målestok. Fuge trykkes således mørtelfuge er ca. 12 mm. Udfordringer med at nederste fuge 'trykkes' ned og mindre end 12mm	Løberforbandt/Skrabefuge 12mm	JA, se overfor	Se forsøg 02		
14. november 2024	Forsøg 07 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2030	300x145x90	Rødvig Jurakalk, 2% fra KALK	Lermørtel tilsat Rødvig Jurakalk 5 l færdig blandet ler kg 10.75 kg 5 l vådt er tilsvarende ca. 7kg tørt 20 l færdigt ler - 860 gram jurakalk	Blandes vha. tvangsblander, derefter opmuring udført på en palle af plastik Vi lægger mørtel ud i en lang stribe på en palle af plastic, og derefter opmuring. Fuge checkes vha. målestok. Fuge trykkes således mørtelfuge er ca. 12 mm. Udfordringer med at nederste fuge 'trykkes' ned og mindre end 12mm	Løberforbandt/Skrabefuge 12mm	JA, se overfor	Se forsøg 03		
26. november 2024	Forsøg 08 Komprimret lersten (EVO) Nr. 20 Sten 21/10 2031	300x145x90	Østerskalk 2%	Lermørtel tilsat Østerskalk Portion I 4000 g lerpulver 8000 g grus 240 g østerskalk 2.4 vand Portion II 5000 g lerpulver 10000 g grus 300 g østerskalk 2.9 vand Se note (1)	Den første portion er rørt i hånden med murerske. Den anden portion er rørt med skovl. Materialer vejes op påvægten. Kalken pakkes ud, og er indpakket i stanniol. Stanniol er delvist opløst, og børst bort så godt det nu som kunne lade sige gøre. Kalken udrøres i hånden med 1.5 dl vand. Tilført lerpulver og mere vand, Vi lægger mørtel ud i en lang stribe på en palle af plastic, og derefter opmuring. Fuge checkes vha. målestok. Fuge trykkes således mørtelfuge er ca. 12 mm.	Løberforbandt/Skrabefuge 12mm	Se note [2]. JA, se overfor.	NEJ		
Dato	**Produkt**	**Format L x B x H**	**Lermørtel**	**Materialer**	**Metode**	**Type forbandt og fuge**	**Datablade eller analyse (links)**	**epd**	**Temperatur**	**Noter**
Note	**Note**	**Note**	**Note**	**Noter**	**Noter**	**Noter**	**Noter**	**Note**	**Note**	**Noter**
Østerskalk forsinket i tolden, hvorfor opmuring først foretages 25. november 2025	Nummeret henviser til pallenummer	Det blev besluttet kun at anvende de store sten, og variere opmuringsmetoden - fremfor to typer af forbandt	Grundmørtel er Energiens Hus/Ler og Liv's egen opskrift, og basis i alle typer af forsøgene	**Note (1)** **Mail af den 5. november 2024** **Til sidsel Sander** **Fra Martinussen Tradisjon og Kompetanse As** Østersskalken du får er ikkje eit produkt som er til salgs enno. Der er derfor ikkje utarbeidd datablad etc. **Litt info om stillehavsøsterskalken du får:** Østersskjella vart brent i august 2020. Skjella er brent på ca 900-1000 grader i kalkovn. Fyringsmiddel er trekull og ekeved i fyringsrommet. Trekull og østersskjell ligg lagvis i kalkovnen. Skjella er brent i ca 10 timer. De brente østersskjella er leska med varmt vatn. Ved tilsetting av varmt vatn får du ein kjemisk reaksjon der temperaturen stig til ca 250-300 grader. Eg legg ved to analyserapportar frå Construction Materials Consultants Ltd, Skotland. Desse er analyse basert på same forekomst av østersskjell, som den østerskalken du får i posten. **Før du bruker kalken:** Siand den løske kalken med netting si den med 1-2 millimeter åpning i netting. Da vil du få ein renare kalk til forsøkene. Til mørtel har eg brukt østerskalken i blandingsforhold med tilslag av sand 1 kalk : 1 sand, 1 : 1,5 og 1 : 2. Alle fungerte fint som mørtel. Hot Mix fungerer også fint med østerskalk. **Modtaget:** 1,4 kilo løsnet østerskalk. Dette er råkalk som har i seg urenheter	Der er taget billeder undervejs 4 af forsøgsopstillinger, metode, vægrafvejning m.v., afrapportering pågår (20241125)	Enten limes eller fuges (12mm)	Note [2] Forsøg af indsamlet lerjord fra "Nærheden" // MG UDFØRSEL 1. Prøve af tiljord (sigteprøve) = ler 2. Prøve i glas (vand) Note [3] Analyserapport fra Construction Materials Consultants Ltd, Skotland. Dette er analyse basert på same forekomst av østersskjell oplyser Martinussen Tradisjon og Kompetanse As	EPD er for udelukkende for jurmørtel	Står overdækket og frostfrit. Afløses efter 8 uger	

Apendix B

Dato	Produkt /forsøgsnummer	Format L x B x H	Lermørtel+	Materialer	Resultat	Type forbandt og fuge
18. januar 2024	Forsøg 01 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2024	300x145x90	100% Energiens Hus 'egen lermørten' (LKN)	3 l lermørtel Lerpulver og postevand (LKN)		Løberforbandt/klæbes
18. januar 2024	Forsøg 02 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2025	300x145x90	Rødvig Kulekalk årgang 2018, 2% fra KALK	3 L lermørtel + 140g kulekalk		Løberforbandt/klæbes
18. januar 2024	Forsøg 03 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2026	300x145x90	Rødvig Jurakalk, 2% fra KALK	3 L lermørtel + 145g jurakalk		Løberforbandt/klæbes
18. januar 2024	**Forsøg 04** Komprimret lersten (EVD) Nr. 20 Sten 21/10 2027	300x145x90	Østerskalk – 2%	4000 gram lerpulver 80 g østerkalk + 1.5 cl vand. Anvendt i alt dl. 1.66 cl postevand Se note		Løberforbandt/klæbes
18. januar 2024	Forsøg 05 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2028	300x145x90	100% Energiens Hus 'egen lermørten' (LKN)	Alm lermørtel 1 ler til 2 sand - i realiteten 1:4 pga beskaffenheden af moræneler		Løberforbandt/Skrabefuge 12mm
18. januar 2024	Forsøg 06 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2029	300x145x90	Rødvig Kulekalk årgang 2018, 2% fra KALK	Lermørtel tilsat Rødvig kulekalk årgang 2018 5 l færdig blandet ler kg 10.75 kg 5 l vådt er tilsvarende ca. 7kg tørt 20 l færdigt ler - 855 gram rødvig kulekalk		Løberforbandt/Skrabefuge 12mm
18. januar 2024	Forsøg 07 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2030	300x145x90	Rødvig Jurakalk, 2% fra KALK	Lermørtel tilsat Rødvig Jurakalk 5 l færdig blandet ler kg 10.75 kg 5 l vådt er tilsvarende ca. 7kg tørt 20 l færdigt ler - 860 gram jurakalk		Løberforbandt/Skrabefuge 12mm
18. januar 2024	Forsøg 08 Komprimret lersten (EVD) Nr. 20 Sten 21/10 2031	300x145x90	Østerskalk 2%	Lermørtel tilsat Østerskalk Portion I 4000 g lerpulver 8000 grus 240 g østerkalk 2.4l vand Portion II 5000 g lerpulver 10000 g grus 300 g østerskalk 2.9l vand		Løberforbandt/Skrabefuge 12mm

Notes

[i] Clay from 'Nærheden' Denmark

[ii] https://renovering.kalk.dk/wp-content/uploads/2024/08/Roedvig_Kulekalk_Final_gold_190824.pdf
http://renovering.kalk.dk/wp-content/uploads/2022/05/2020-02-gold-roedvig-kulekalk-cl-90-s-pl.pdf

[iii] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://renovering.kalk.dk/wp-content/uploads/2022/05/rplus%C2%A9dvig_jurakalk_final_gold.pdf
*https://renovering.kalk.dk/wp-content/uploads/2023/11/md-23029-en_rev1-1.pdf

[iv] Certificate of Test & Analysis on Oyster Shell & Oyster Shell Quicklime (Ref: M/2088/20/C2-rev 1)
Certificate of Test & Analysis on Mortar Samples for Physical Properties & Composition (Ref: M/2088/20/C1)