**The Inlaid‑Linoleum Process and its Relation to Schatzalp**

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**1 Inlaid‑Linoleum at Schatzalp**

**1.1 Introduction**

The present‑day mountain hotel on Schatzalp, built from 1898 to 1900 by the Zurich architects Otto Pfleghard & Max Haefeli, was originally a Sanatorium and spa. Schatzalp belongs to the tradition of numerous sanatoria erected in the Alps at that time, as fresh mountain air and sunlight were considered curative—especially against tuberculosis. Aimed at the upper social classes, this is reflected in the building’s luxurious fit‑out and the patients’ extravagant lifestyle. After the first effective anti‑tuberculosis medicines appeared in the late 1940s, sanatoria for pulmonary patients became obsolete. The institution on Schatzalp was therefore converted into a hotel in 1953–1954. Traces of its original use, however, are deeply embedded in the building’s architecture and remain visible today.

Architecturally and from a heritage perspective the Sanatorium Schatzalp is notable for its construction: it was among the first buildings in the Canton of Graubünden to use a reinforced‑concrete structure (Système Hennebique). In terms of design, the building reveals multiple influences—Pfleghard & Haefeli’s penchant for mixing architectural elements is unmistakable. While representative rooms such as the dining room and conversation salon display prominent Jugendstil ornamentation, the exterior is restrained and strongly informed by the load‑bearing frame, with clear forms and volumes. The building thus marks—both constructively and stylistically—a transition from historicism to modernity.

Aligned with the hygienic demands of the institution, linoleum was installed in corridors and patient rooms because it was easy to clean and was soon found to have bactericidal effects. In keeping with the spirit of the time, these linoleum floors were ornamental—specifically, they imitated the refined patterns of oriental carpets both in corridors and rooms. With its distinctive materiality, the Sanatorium Schatzalp thus contributed to contemporary building practice and is still regarded as a key forerunner.

What is special about these floors is the type of linoleum: executed as Inlaid‑Linoleum, which has not been manufactured for decades, they are an important witness to this kind of floor covering—then seen as a sign of progress in terms of cleanliness and production.

**1.2 Current Condition**

Today, only a few remnants of the original linoleum are presumed to survive at Schatzalp. Through an exchange with Dr. William Lee (historian and social‑media staff at Schatzalp) we accessed archival photos. Large portions of the floors were removed or covered with carpet after the conversion to a mountain hotel in 1953. Floor finishes now vary between rooms, and it is unclear where original linoleum persists. In total, four linoleum patterns were identified as once present at Schatzalp.

**1.3 Research Questions**

Since its installation, Inlaid‑Linoleum played a significant role in the Sanatorium’s appearance. Past interventions into the linoleum stock were often not conservation‑minded and downplayed the historical value of the floors. This work analyses this special linoleum type in relation to Schatzalp and considers possible approaches to restoration or reproduction.

Key question: How should the remaining linoleum at Schatzalp be handled in the future? Which measures are appropriate from a restorative and conservation perspective? Are there contemporary techniques for reproducing Inlaid‑Linoleum that are viable economically—and should the material return to Schatzalp? Which properties ought to be retained or complemented?

**2 History of Inlaid‑Linoleum**

**2.1 General history of linoleum**

In England, alternatives to carpets were sought under the term “floorcloth” in early patent registers. The 1843 patent by Henry Purser Vaile formed a foundational basis: his rubber‑cork compound—later known as “Kamptulicon”. Perforated metal sheets were filled with plastic masses of different colours; after rolling, a flat, coloured surface resulted. In 1844 Elijah Galloway filed the patent for the official “Kamptulicon”, a new wall and floor material consisting of a mixture of gutta‑percha, rubber and cork powder. Unlike its predecessor, plates were either bonded directly to the wall/floor with putty or under‑backed with a support fabric to permit later removal. The focus lay on paintability and ornamental enrichment of interiors—alongside sound‑damping and heat‑retention as welcome side effects.

Lawrence Bunn worked to remedy deficiencies such as low strength and high temperature sensitivity, e.g., by embedding thin wire mesh or perforated metal plates, and by colouring the mass itself to combat rapid wear of surface pigments. Adoption was initially modest but, by the late 1850s, improved processes enabled profitable manufacture, prompting factories and broad application in public and semi‑public buildings. Kamptulicon was relatively expensive due to cumbersome production and costly raw materials (approx. 1:12 cork‑to‑rubber), prompting a search for substitutes for rubber.

In 1860 Frederick Walton’s patent displaced Kamptulicon with “Linoleum” (from Linum + Oleum). Rubber was replaced by an “india‑rubber substitute” of linseed oil and resins with similar properties. Contrary to popular belief, linoleum consists largely of plant‑based raw materials. Walton’s key discovery: linseed oil oxidises in air into a viscous transparent mass; oxidation is accelerated by heat and oxygen donors. Walton exposed varnish to warm air and maximised surface area to speed drying. In 1863 he patented bonding cork meal with oxidised oil and gum/resins and applying the mix to fabric, as well as surface ornamentation by printing, embossing and painting. He founded Linoleum Manufacturing Co. Ltd. in Staines (near London) and later expanded to Paris, Delmenhorst and New York; by 1888, England alone had 20+ linoleum factories.

**2.1.1 Properties**

Linoleum is a mixture of oxidised linseed oil (Linoxyn), cork meal and resins. A several‑millimetre wear layer is bonded to a varnished jute fabric (typically 41–46 yarns, 10–20 twists per metre). Cork particles are fully encapsulated by Linoxyn, making the material water‑tight and pore‑free—allowing wet cleaning. Low thermal conductivity yields a comfortable surface temperature. Linoleum also exhibits antibacterial and germicidal properties owing to linseed‑oil components released over its service life.

Its elasticity provides sound absorption, often enhanced with additional cork or more viscous Linoxyn (so‑called ‘cork linoleum’), and sometimes with sub‑layers such as cork, peat, pumice boards or sand. At Schatzalp, felt mats were laid beneath for sound absorption. Linoleum came plain or patterned, frequently in earth tones. Plain material was coloured throughout to remain uniform after wear, though it was more prone to visible streaks and thus less suited to heavy‑traffic areas than patterned variants. Patterning was achieved by placing differently coloured granular masses onto the fabric, by printing oil‑based inks onto plain linoleum, or by assembling differently coloured cut pieces—yielding Granite‑, Inlaid‑ (Mosaic‑) or printed linoleum. Standard roll widths were 1.83 m, 2.00 m or 3.66 m at 25 m lengths; thicknesses ranged roughly 1.6–3.75 mm.

**Inlaid‑Linoleum Thesis — English Translation (Part 2)**

**2.2 Emergence of Inlaid‑Linoleum**

Also called Mosaic Linoleum, Inlaid‑Linoleum was less common due to the difficulty of production and resulting higher cost. However, technical advances helped mitigate this disadvantage. Its specific production method allowed unlimited colours and patterns — geometric, floral or ornamental — to be created, repeatable across full roll widths and lengths. Unlike mosaic versions assembled from cut pieces directly onto the fabric, Inlaid‑Linoleum applied patterns to an intermediate layer covering the base fabric.

**2.2.1 Production**

Linoleum is produced in three main stages: (1) fabrication of Linoleum cement (the binder), (2) mixing raw materials into the linoleum mass, and (3) pressing this mass onto jute fabric. The name ‘Inlaid’ refers to the ‘laying in’ of differently coloured linoleum masses. This could be achieved by cutting and recombining sheets, embossing, cutting techniques, or scatter methods.

**2.2.1.1 Production using pressed wear layers**

Embossing method: two differently coloured sheets were passed through engraved rollers to create high‑ and low‑relief patterns. These were then fitted together, heated, and hydraulically pressed into flat linoleum boards, later split horizontally to produce matching patterned sheets. Other variants involved filling recessed areas with coarse or coloured masses and pressing them together.

Cutting method: coloured shapes were cut precisely using special blocks and reassembled to form mosaics. Pieces were transferred into frames and pressed onto jute fabric under tension, expanding to fit seamlessly once frames were removed.

**2.2.1.2 Production using scatter method — typical Inlaid‑Linoleum**

This stencil method used metal templates (zinc, copper, brass) to scatter coloured granules in planned patterns onto the base fabric. Each colour required a separate stencil. After deposition, the granules were compressed and fused into a seamless surface. Edges could blur slightly (ca. 3 mm), but dividing strips reduced mixing between colours.

**2.2.1.3 Production at Linoleum AG Giubiasco**

The only Swiss linoleum factory, Linoleum AG Giubiasco, employed ca. 350 workers and produced about one million m² annually. Processes included grinding cork into fine meal; oxidising linseed oil into Linoxyn; mixing with resins (colophony, kauri); maturing the cement; and blending with cork meal and pigments. The mass was rolled, calendered onto jute, and dried in tall chambers. For Inlaid, stencils were meticulously crafted from zinc, with each colour applied separately before hydraulic presses (1500 tonnes) bonded the design to the jute. Finished rolls (2 m wide, 25–30 m long) were dried for weeks, cut, and stored.

**2.2.2 Uses**

Linoleum’s properties made it suitable for many building types: dwellings, schools, gyms, hotels, offices, even ship decks and rail cars. Its antibacterial qualities made it especially popular in hospitals and sanatoria.

**2.2.2.1 Hospitals and sanatoria**

Beyond medical care, patient recovery depended on light, fresh air, quiet and cleanliness. Linoleum contributed by damping sound and providing a seamless, washable surface with bactericidal qualities (from Linoxyn). Hospitals avoided sharp corners, using coved skirtings instead. A related wall/furniture material, Lincrusta, was also widely adopted for its hygienic qualities.

**3 Restoration and Reconstruction of Inlaid‑Linoleum**

Today Inlaid‑Linoleum is no longer manufactured. Labour‑intensive methods, feasible only with cheap early‑20th‑century labour, cannot compete with modern vinyl. By the late 1950s, plastics replaced Inlaid, knowledge and tools largely vanished. Modern linoleum production (e.g., Forbo) is highly automated. Historical presses and stencils may still exist but are inaccessible.

‘Inlaid’ covered diverse methods, not one uniform product. Around 1900 rapid innovation spawned many processes and patents. Defining a sample requires identifying date and manufacturer precisely.

**Inlaid‑Linoleum Thesis — English Translation (Part 3)**

**3.1 Production methods and variants**

Close inspection of surviving floors shows they were made with the scatter method, as used at Giubiasco. This method is no longer viable at scale due to hand‑labour demands. Today only related types are produced. Straight‑Line‑Inlaid (cut/rejoined sheets) and Intarsia survive in modified forms; Printed linoleum and Granite/Jaspé/Marmoleum remain common.

**3.1.1 Straight‑Line‑Inlaid and Intarsia**

Patented by Frederick Walton in 1882, this method cut and reassembled differently coloured sheets, yielding sharp, durable patterns. It imitated tiles or parquet effectively. Intarsia persisted, evolving with style eras: Jugendstil florals, later modernist geometry, mid‑century pastels. Designers and architects were often commissioned. Today, CNC water‑jet cutters replace metal dies, but fine detail raises costs. Most contemporary Intarsia are simple large‑scale patterns for signage or accents.

**3.1.2 Printed linoleum**

This consists of a plain linoleum sheet printed with patterns. Designs are limitless, but wear affects the thin printed surface. Historically, companies offered both Inlaid and cheaper printed versions. Today, annual style collections echo fashion cycles. Economical for reproducing carpet‑like motifs, but only superficial similarity to true Inlaid.

**3.1.3 Granite, Jaspé and Marmoleum**

These feature multicoloured, amorphous patterns mixed into the mass, producing marbled or stone‑like effects through the thickness. They disguise dirt well and remain popular, especially imitating stone. However, they cannot reproduce defined carpet motifs.

**3.2 Conservation and reconstruction**

For decades, linoleum was often removed as a ‘cheap imitation’. This destroyed many historic floors. Recently, recognition of its heritage value has grown. Some prominent examples have been restored or reconstructed, especially where linked to famous designers.

**3.2.1 Peter Behrens — Rathaus Bremen**

The new Bremen Rathaus (early 20th c.) used Inlaid linoleum with a Behrens tile pattern. In the 1970s it was carpeted over, damaging the original. Later, conservator Peter Hahn oversaw reconstruction: patterns were cut with CNC knives from plain sheets and assembled by hand. Effective for select projects but not scalable. The original granular scatter texture was lost.

**3.2.2 Atelier Zürich — Beausite Zermatt**

For the Belle‑Époque Beausite Hotel (1907), renovated 2007, Atelier Zürich collaborated with Forbo to create custom printed linoleum to match room colours. Large panels (150×210 cm) could yield a seamless impression. Each colour file was sent to Forbo for faithful printing. Feasible above 500 m² project size. Ultimately not installed due to client doubts.

**4 The Schatzalp**

**4.1 Classification of surviving Inlaid‑Linoleum**

Archival evidence confirms Schatzalp’s original rooms and corridors used Inlaid‑Linoleum. Installed by 1901, predating Giubiasco’s presses (1908), it was likely imported from Milan or England. Some designs match English Staines catalogues (1902). Exact provenance remains unknown.

To assess conservation value, one must ask: why was this material chosen? Linoleum’s role at the time combined hygienic, comfort, economic and decorative qualities. Its graphics blurred imitation and originality, often imitating oriental carpets. Inlaid’s granular texture, though less sharp than printed types, suited such motifs and conveyed luxury.

**4.1.2 Functionality**

Linoleum offered durability (patterns through the full thickness), cleanliness (bactericidal belief from linseed oil), water‑repellence, ease of cleaning, slip resistance, and comfort (sound and thermal insulation, with felt underlay at Schatzalp). These matched the Sanatorium’s needs. When converted to a hotel, carpets replaced linoleum—reflecting changing priorities.

**4.1.3 Economy**

Inlaid was costly but still cheaper than true carpets or marble. Schatzalp’s luxury context meant cost was secondary, though savings may have influenced choices.

**4.1.4 Modernity and democracy**

Linoleum, mass‑produced from global raw materials, symbolised industrial progress and wider access to ornament. Once seen as lower‑class substitute, it came to embody modern, hygienic living and democratic design. Schatzalp’s architects embraced new materials, making Inlaid fitting.

**4.2 Handling remnants at Schatzalp**

Future handling requires prioritising preservation of intact areas. Small repairs may be possible but costly. Decisions should weigh which original characteristics (graphic, hygienic, comfort, economic, symbolic) matter most. Reproduction could consider Intarsia or printing, but each departs from the original scatter texture.

**4.3 Reproduction strategies**

Options include: (1) conservation of fragments, (2) creating historically inspired new patterns using modern methods (cut, print), (3) collaborating with manufacturers for bespoke runs. Costs and authenticity vary.

**4.4 Reproduction of Inlaid patterns**

Reproducing carpet‑like designs with today’s techniques is challenging. Intarsia allows sharp patterns but is expensive. Printing is economical but superficial. Granite/Marmoleum cannot reproduce defined motifs. Any reproduction would involve compromise.

**4.5 Conclusion**

The Inlaid‑Linoleum floors of Schatzalp embody a unique convergence of hygiene, comfort, ornament and modernity in early sanatorium design. Though original production is lost, recognition of their heritage value is essential. Conservation of surviving fragments and careful selection of reproduction strategies can honour this legacy.

**5 Appendix**

5.1 Bibliography — [Omitted in translation: full reference list of sources].

5.2 List of figures — [Omitted in translation: figure captions remain unchanged].