Artistic development opportunities based on the reconstruction of reverse printing

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Abstract

This article presents the role of artistic development and the potential for the modernisation of techniques based on the practice-based research project "Reconstruction and Artistic Development of Historical Relief Print Technique" conducted at the Estonian Academy of Arts. The aim of the project was to recreate, as faithfully as possible, a unique relief printing technique used in the studio of leather and bookbinding artist Eduard Taska in 1924, and based on this experience, to adapt the technique to meet today's needs and conditions. The article provides an overview of the recreated historical technique, and then focuses on the results and analysis of the development activities derived from this. The three aspects of the research are presented. First, the article introduces experiments with different printing plate materials and methods for preparing the plates. Second, it analyses printing results with different types of pattern designs and third, the article compares printing results on various kinds of leathers and leather-like materials.

Keywords: artistic research, leather-work, relief printing technique, reverse printing

Introduction

The ease of physical and digital access to museum artefacts has increased the popularity of revivals, reinterpretations and referencing. Both hobbyist and professional design are characterised by the popularity of retrospective design. This means combining visuals, different styles and aesthetic choices to create something new but reminiscent of the 'old'. Alongside copying and playful imitation, analysis and the contextualisation of techniques and construction has emerged (Somerson 2013). Methodological approach both to sources and creations reveals itself in artistic research. Artistic, also called practice-based research is academic research done through art or design (Frayling 1993; Vaughan 2017). This means that contextualized creative experiments are used

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to understand and analyse the research problem, and the purpose of practice-based research is to contribute to specialist knowledge and develop the field (Zimmerman, Forlizzi 2008). In this article, artistic development as a term is derived from artistic research to emphasise the role of creativity.

Artistic development differs from retrospective design in the way that it defines the research problem, the narrow and clearly defined research input, and the need for expert knowledge. All aspects of the reconstruction become input in the creative development process and are important for understanding the way it functions and why. The focus of artistic development when dealing with input is on the creation of new knowledge by combining creativity with previous skills. Practitioner experience is indispensable. The researcher must also be an experienced practitioner (see Schön 1983; Jarvis 1999). Donald Schön (1983: 128–140) claims that previous experiences, which he calls the 'variety of repertoire', is the most important component in a practitioner's work. It helps them see that each new task consists of familiar, as well as unfamiliar elements. Thus, by treating each case as unique and combining previously familiar procedures with new inventions, the practitioner increases their experience and their expert knowledge. Therefore, systematic artistic development needs a practitioner's perspective, the ability to delve into details and conduct an in-depth analysis. Artistic development enables to study old artisanal techniques as well as to see the connections and opportunities for adapting the subject to the modern context, requirements and possibilities.

The development of traditional and original techniques is a good way to simultaneously preserve traditions and develop the subject field. For example, leather art in Estonia is a field of applied art with a long tradition, and is increasingly affected by changes in consumer values. Finding a balance between the emotional and physical properties, functionality and expressiveness of leather as a material is increasingly important. In the production of accessories, eco-friendly and non-toxic leathers are preferred, alternative materials are sought, and digital technologies are increasingly being used alongside artisan techniques. Artistic research enables to turn artisanal, time and resource intensive techniques into a replicable and sustainable option in everyday practice for designers in the creative industries.

The article introduces a reconstruction and artistic development of a leather decorative technique used in the studio of leather and bookbinding artist Eduard Taska in 1924. Namely, it is a relief printing technique that is distinguished from the well-known cliché and linocut by its two-dimensional result and the absence of fine graphic lines. The article is based on the project "Reconstruction and Artistic Development of Historical Relief Print Technique" conducted at the Estonian Academy of Arts. The project aimed

to contribute to knowledge about the technological options and capabilities at the most important workshop in history of local leather and bookbinding and to research this unknown technique and find application for it in the development of traditional Estonian leather work. This meant that the recreation, as faithfully as possible, of the historical examples was followed by an application stage where the aim was to study the potential for further development of the historical reconstructions and adjust these according to the current day creative industries context.

The article provides a short overview of the background and recreation of the historical technique and then concentrates on the artistic development of the project. The aspects of the research are presented through introducing the process of experiments, describing the choices and analysing the results. First, the article introduces experiments with different printing plate materials and methods for preparing the plates. It is followed by the analyses of printing results with different types of pattern designs, and finally, the article compares printing results on various kinds of leathers and leather-like materials. The article concludes with an overview of the main findings of the artistic development.

Background

This current practice-based research project was prompted by a study into the Estonian handbag designs created and used in the first half of the 20th century (Päeva 2021; Päeva 2022). Alongside the repetitive styles, decoration techniques and production methods two leather handbags made in Eduard Taska's workshop in 1924 and now belonging to the textile collection of the Estonian History Museum (items AM 15737/1 and AM 15737/2) stood out because of their strikingly different appearance (photo 1). In addition to the bold and distinctive silhouette and pattern design, the handbags are decorated using a relief printing technique that is different to the cliché and linocut prints techniques more commonly used. The design consists of asymmetrical shapes that are embossed into the surface and darker in tone. What makes this unusual is that the design has two levels, has no line work and consists only of shapes.

The work and products made at Eduard Taska's atelier and training workshop have been studied in depth by Kaalu Kirme (1965, 1973) and Endel Valk-Falk (1994). Both, with their backgrounds as leather artists, have put special emphasis on describing Taska's designs and techniques but the said printing technique has not been mentioned. There may be several reasons for this. For one, both the design and technique used differ from work made by Eduard Taska himself and the content analysis (Hsieh, Shannon 2005: 1283–1285) completed within this study, which dealt with the comparison of publications, archival data and documents, established that it is likely that both the

Photo 1. Hexagonal AM 15737/1 and pentagonal handbag AM 15737/2 from the textile collection of the Estonian History Museum. Both bags are fully covered with a two level design, the pattern of which is asymmetrical and darker in tone. *Photos by Meeli Küttim.*

patterns and the techniques used are not the work of Taska, but either the work of the first group of students in his workshop or their teacher Adele Vetmar-Haav. The first group began their studies in 1924 (Valk-Falk 1994: 55–56) and were supervised by Adele Vetmar-Haav, who had just returned

from training at the Hamburg School of Art and Design (Kirme 1973: 153). Under her supervision they designed and produced items with geometric patterns that covered entire surfaces. These were shown at the IV Estonian Fair in Tallinn in 1925 as part of the Taska workshop display (Valk-Falk 1994: 65, 77: see photo 2). The typical designs on the book bindings, handbags and other products made in the Taska workshop in the 1920s were symmetrical, with an enclosed composition where the decorative motif is positioned within a frame or as a central image. The asymmetry of the pattern in question and the use of non-repeating elements is more like the textile than leather design patterns of the time, resembling especially the fabrics designed in the Wiener Werkstätte workshops in Austria[1].

Photo 2. Taska's display at the IV Estonian Fair in Tallinn in 1925. In addition to three handbags decorated with the relief print pattern also three bindings carrying the same pattern are partially visible. *Photo from EDTM[2] collection.*

1 For example, textile samples 1994.549.20 and 1994.549.29 from the New York Metropolitan Museum of Art present similar composition logics as two handbags under investigation. These were made in Wiener Werkstätte studios between 1910 and 1928. (Samples are virtually exhibited here: https://www.metmuseum.org).

2 The Estonian Museum of Applied Arts and Design (Eesti Tarbekunsti- ja Disainimuuseum).

A second reason could be that the relief printing as a type of technique was not widely used. The museum's acquisition notes claim that both handbags, made in 1924, were prototypes and due to a lack of interest from buyers, did not go into production. There are no examples of the same or similar patterns or the use of this printing technique in any of the information about work from the Taska workshop. It can be assumed that further development of this distinctive printing technique came to a stop along with the design. The technique was forgotten and by the middle of the 20th century it was unknown in Estonian leather work, and thus also not known by Taska's researchers. The third reason is that the technique survived on leather handbags and this impeded its inclusion in 20th century historical accounts. Estonian researchers of artistic leather work focused on bookbinding and exhibition pieces and for them decoration was of primary importance. Bags, shoes and other accessories were mostly without decoration and mainly focused on form and colour, and were classified as consumer goods and therefore were taken as with little artistic value (Kirme 1965: 3).

Reconstruction of relief printing

During the reconstruction phase of the practice-based study, we relied on the results of object analysis carried out in the museum repository. According to Jules David Prown (1982: 7–10), object analysis is threefold. It consists of the measurement and description of the object under investigation, deduction and speculation. In the case of relief printing, deduction and speculation meant delving into the details of the technique, comparing the techniques used on the two bags with known relief printing methods, and proposing a hypothesis that describes the work processes that can be tested through experimentation. We used materials as similar as possible to the historical ones and repeatedly changed and refined the hypotheses during the experiments. The practical experiments focused on determining the printing method visible on the bags, the material of the printing plate, the printing conditions and the stages in the printing process. At the same time, we experimented with dyeing the leather and recreating the design to achieve a result as similar as possible to the original. It was necessary to conduct a series of experiments, each with a different focus, to understand the technique and how to achieve a complete outcome.

We performed the tests on vegetable-tanned goatskin, similar to that used in handbags AM15737/1 and AM15737/2, which was produced in Estonia at the Skinex leather factory in Jõgeva. For dying the leather, we preferred water-based aniline dyes, similar to that used in the Taska workshop. We applied the dye to the leather in the traditional way – with a brush and cotton swab. A close examination of the bag surfaces revealed that the design consisted of

Photo 3. Reconstruction results. Above: printing plate that consists of a 2 mm steel plate and 0.45 mm thick cardboard motifs glued to it. Below: finished print sample on dyed vegetable-tanned leather. The sample is similar to the historical one – pattern relief, darker in tone, is detectible on both sides of leather and a thin light line surrounds the motif edges on leather surface as is characteristic to the reversed printing. *Photos by Tobias Tikenberg.*

individual motifs that had been attached to a printing plate surface measuring approximately 20×20 cm. These were pressed into the leather repeatedly and in different directions before cutting out the bag details. Due to changing distances between the same pattern motifs and adjustments in motifs' silhouettes, we ascertained that the historical printing plate was two-layered. Tests regarding the material of the printing plate showed that in order to achieve a glossy result, the printing plate must have a smooth, plain surface, and to ensure that it could sustain repeated printing be resistant to pressure, heat and moisture. We achieved the most similar result in our reconstruction with a printing plate that consisted of a steel baseplate with cardboard elements glued to it (photo 3).

With the printing methods we tested cold printing on both dry and moistened leather but did not achieve the desired result. So we continued the tests with hot printing where in addition to pressure and duration, the high temperature influences the printing result. Throughout the process we compared our experiment series with the original and adjusted the needed conditions applying our previous experiences on relief printing. Detailed examining of the depth of the relief, its extent, as well as tonal differences of the design and the background led us to a technique, which we call reverse printing due to process logics. The printing press normally presses the printing plate against the right side of the material resting on the bed, but in our reverse printing method the printing plate sits on the bed with the pattern facing up. The leather is laid on top of it with the surface facing the printing plate, and the press pushes the leather against the printing plate. We identified the optimal setting for the printing press – the press, heated to 120° C must press the material to be printed against the printing plate with a force of 1500 N for 30 seconds.

In the case of conventional cliché printing, the heat of the printing press first affects the printing plate and only then affects the material to be printed, whereas in reverse printing, the heat first passes through the material to be printed. This means that materials that conduct heat poorly or not at all are also suitable for the printing plate. It follows that in reverse printing, it is possible to expand the range of printing plate materials suitable for hot printing, and as a technique it has potential for artistic development.

Artistic development of reverse printing

When reconstructing the relief print under investigation, we used materials, tools and techniques used in the 1920s, or as similar as possible. In the experiments we focused on ascertaining the printing process, the necessary conditions and sequence of processes. In the next stage of the artistic development, we used the printing settings and process revealed during the reconstruction process, in other words, we reverse printed with the most optimal setting

(1500 N/ 30 sec/ 120° C), but then tried other materials for the printing plate and the printed material. First we experimented with finding alternative materials for the printing plate and ways of preparing the printing plate, then we experimented with the density, type and placement of the pattern on the printing plate, and thirdly, we performed printing tests on different leathers and leather-like materials.

When choosing the materials for the printing plate we preferred easily available and affordable materials in which the price, time and environmental impact of cutting out the pattern would be noticeably lower than etching a magnesium plate for cliché or hand cutting linoleum. We also considered the options for reusing offcuts and the potential for collecting post-printing offcuts separately. The selected materials had to be sufficiently resistant to pressure, humidity and heat. The choices were MDF (medium density fibreboard) board, linoleum, electrical insulation board and various plastics (polyethylene, PMMA acrylic sheet, acrylic glass and polyester Axpet). To compare the printing results we performed all the tests with vegetable tanned cowhide. The varying composition and thicknesses of the printing plate materials, which ranged from two to eight millimetres, provided the opportunity to experiment with different printing plate production methods, both single- and double-layer plates and culminated in the development of three types of printing plate.

First, we tested printing plates that look similar to traditional printing plates; that is, the background of the design is recessed about 3 millimetres into the plate. Materials up to 10 millimetres thick were most suitable for this. With the MDF board we tested CNC milling to create the pattern and with linoleum we tried laser engraving. The advantage of CNC milling over laser engraving is a cleaner result. In mechanical milling there are no burn or melt residues that can stain and which are characteristic of laser engraving. These are difficult or near impossible to remove from the printing plate. However, the advantage of laser engraving is the ability to create a very precise and detailed printing plate. There are no restrictions on the design of the pattern with either technique, and it is possible to make the pattern or its background as the printing surface. However, the moisture sensitivity of the printing plate may become a problem. For example, in the case of MDF with a waterproof surface, moisture resistance was noticeably reduced when the pattern was deep. To prevent deformations and swelling and to increase the number of times the plate could be used, we covered the entire printed surface of the MDF printing plate with a glossy laminate film (photo 4). On a positive note, the adhesive layer of film reduced the sharpness of the cut edges of the design (this eliminated the risk of damage to the leather occurring during printing), smoothed the surface texture of the plate (which increased the gloss of the

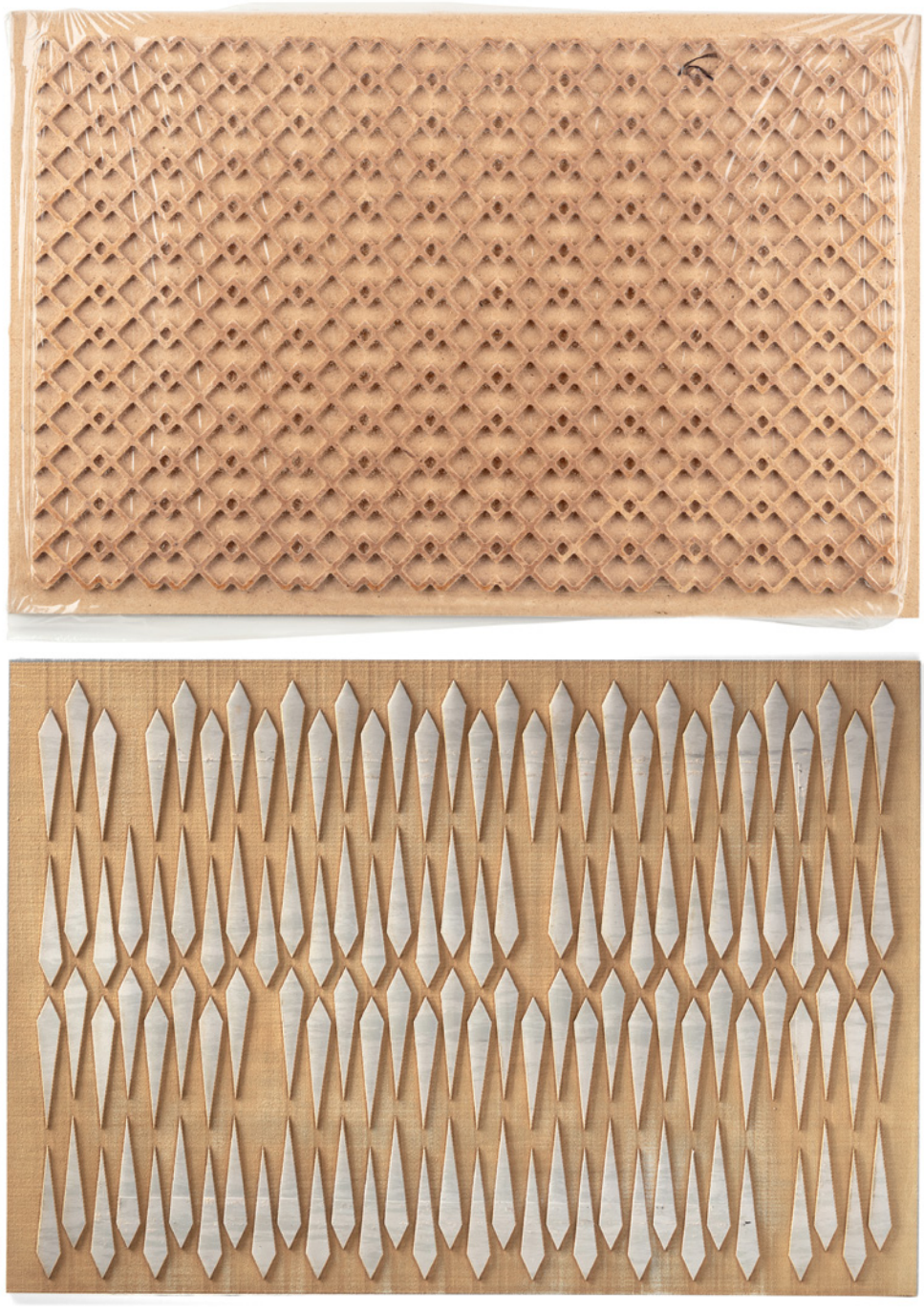

Photo 4. Printing plate samples of A4 format. Above: CNC-milled MDF board covered with laminate film. Below: laser-engraved linoleum. Both are rigid and convenient to use.
Photos by Tobias Tikenberg.

printed result and helped unify it) and ensured a clean print. However, the disadvantage turned out to be the fact that during printing, the dense printing plate does not allow the moisture in the leather to evaporate quickly, and the hot steam can make the print result dark or uneven. The laminate film amplified this effect. To avoid this situation, the humidity level in the printing room must be monitored and the air in the room should be as dry as possible. Printing tests showed that milled and engraved printing plates are convenient to use because due to the thickness of the material the plates are rigid and during repeated printing the pattern does not move out of place.

We then tested laser cutting of the printing plate. This has the advantage of speed and accuracy and the design can be cut to the full extent of the thickness of the material. However, in comparison to the reconstruction, in the laser-cut plate the design is no longer the higher part of the printing plate. To produce a single plate the background of the pattern must form a mesh-like surface which means that pattern must consist of cut out elements separated from each other. The result of the print is also the opposite – the design is lighter and higher than the background (photo 5).

To increase the number of times the plate can be used and provide support for the laser-cut printing plate, it is a good idea to use a base plate when printing. 2 mm thick steel plate is suitable for this, as well as 2 mm cardboard. Tests showed that smooth-surfaced steel plate is suitable for thinner but more heat-resistant materials, such as 0.45 mm thick electrical insulation cardboard. It is best to use cardboard as a base plate when using plastics that react to an increase in temperature. When using plastic as a printing plate,

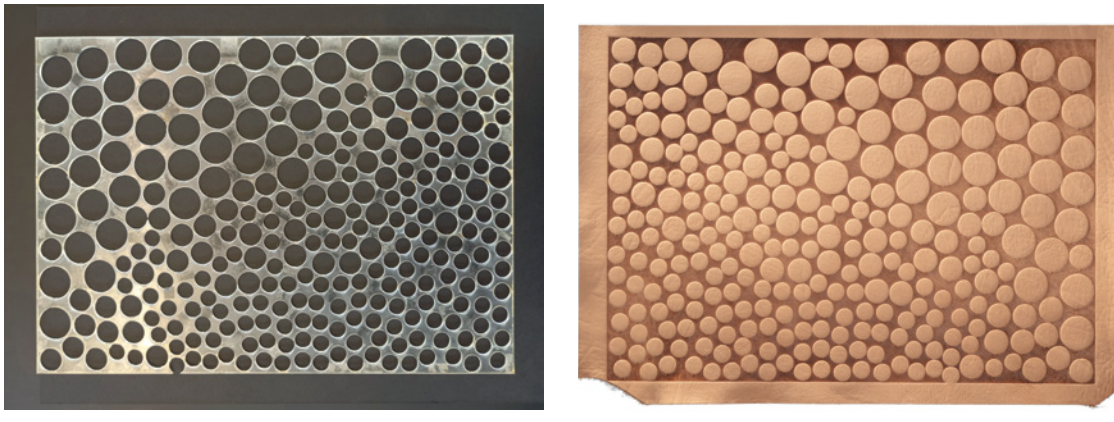

Photo 5. Printing result with a laser cut plate: on the left, laser cut polyester Axpet on black cardboard base, and on the right, the result of its reverse print on vegetable tanned leather. When the lighter tone of pattern motifs emphasises the natural texture of leather, the darker shade of background leaves the effect of a closed frame. *Photos by Jaana Päeva and Tobias Tikenberg.*

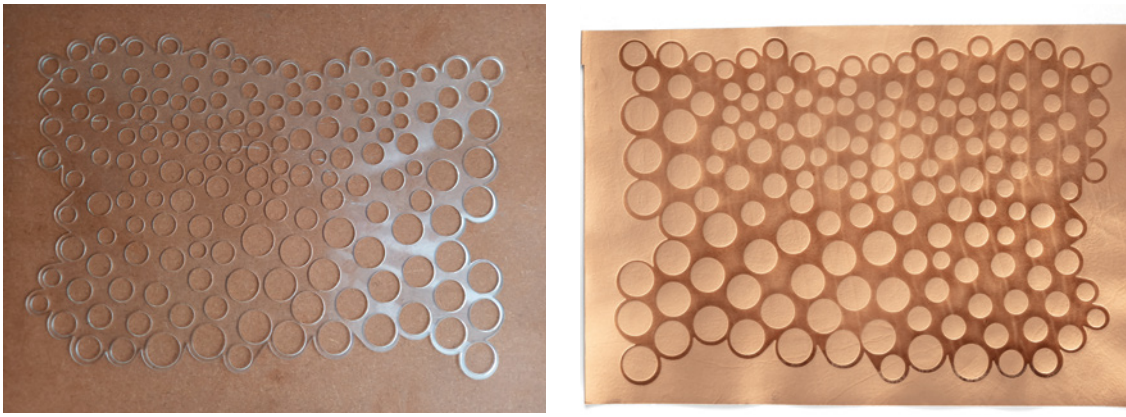

Photo 6. Printing result with a laser cut plate: on the left, laser-cut PMMA acrylic printing plate, and on the right, print result on vegetable tanned leather. The laser cutting of the plate follows outer lines of the pattern to minimise the background area for reducing the effect of a frame. Shiny PMMA acrylic plate leaves a high contrast result on leather and adds a glossy effect on the background of the design. *Photos by Jaana Päeva and Tobias Tikenberg.*

the number of times they can be used depends on their resistance to pressure and heat. Our tests revealed that acrylic glass (Plexiglas), is not suitable for printing due to its fragility. The sharp corners and fine lined surfaces can break under pressure. Polyethylene and polyester Axpet react to heat and as they cool after printing they can deform. To avoid this we allowed the printing plates to cool under light pressure. PMMA acrylic turned out to be the most durable plastic. Experiments with 1–3 mm thick plastic showed that the thicker the plastic of the printing plate, the more durable it is in printing. Plastics generally have a very smooth surface and the advantage of the more heat-resistant ones over other materials is its high-gloss result – the background of the design shines regardless of tonal differences (photo 6).

In the development of the printing plates, we also experimented with printing individual details. The main focus was on the way the details were attached to the plate to ensure the design could be repeated. In the reconstruction phase we glued the cardboard details to a steel plate to obtain a design with a fixed layout and to be able repeat the pattern, but now we made the elements of the design from a magnet sheet, so that they would be magnetically attached to the steel base plate. As a second option, we laminated the individual plastic parts to the base cardboard. The advantage of a design consisting of separate elements is the potential for creating different compositions on the base plate. The number of details, their direction and the distances between them can be varied. With minimal cost it is possible to replace or add new parts and reuse old ones. By using sheet magnet moving

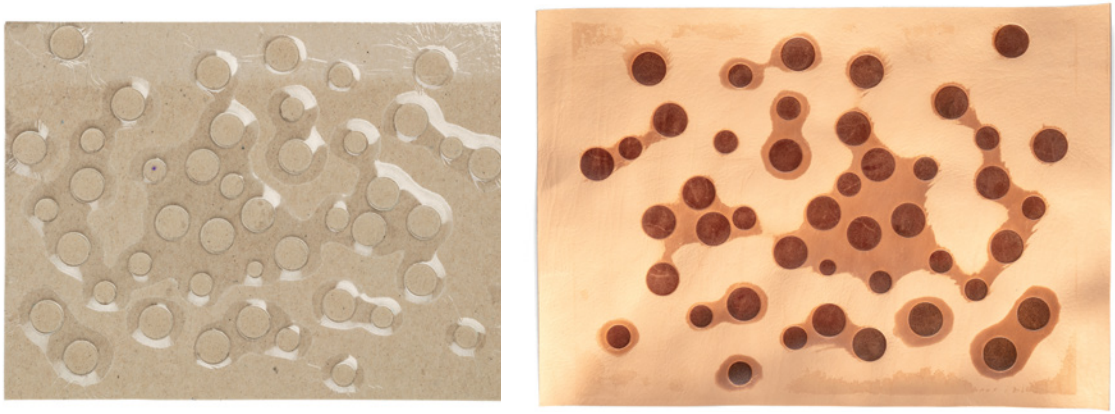

Photo 7. Printing result with laminated individual details: on the left, laminated 3 mm PMMA acrylic design on cardboard, and on the right, its reverse print on vegetable tanned leather. Partially unattached laminate affected the printing result and distorted the original pattern design. *Photos by Tobias Tikenberg.*

details on the printing plate is easy and the printed result is clear and precise; however, the printing plate must be made of ferromagnetic metal. In the case of lamination, cheaper and recyclable materials are suitable for the printing plate, including offcuts of cardboard or MDF board. The accuracy of the printing result depends on the thickness of the design elements – the thinner they are the better the laminate film attaches and the printed image is more precise. If air becomes trapped between the laminate film and the surface of the plate, an uncontrollable halo-like area around the details is created due to the printing pressure (photo 7).

We continued printing single elements, shifting the focus to the possibilities of printing with different materials. For example, we experimented by printing with lace, string, leaves and feathers. Until now, in all the experiments, we had used time, heat and pressure to create the relief print, a method called blind printing, but now we decided to experiment with foil printing to enhance the light-dark contrast of the printed result. Foil is an ultra-thin sheet material that is placed between the printing plate and the material to be printed. The dye on the foil is glued to the material to be printed during pressing. Our research hypothesis was based on the distinctive features of reverse printing. In conventional hot printing heat reaches the foil and the material to be printed through the printing plate and this requires the printing plate to be made of heat-conducting material (usually metal), but in the case of reverse printing the heat first passes through the material to be printed and only then transfers to the foil and to the printing plate. In the experiments, it became clear that with the appropriate settings reverse printing enabled foil

Photo 8. Printing result with a foil: on the left, A4 format printing plate made from cardboard with hemp string attached to it, and on the right, the result of reverse printing with gold foil on vegetable tanned leather. The result is detailed, precise and three-dimensional. *Photos by Tobias Tikenberg.*

printing to be carried out using printing plates made of both textile and natural materials. If the plate is sufficiently thick the result is clear and precise. For example, the impression left by the string was three-dimensional and the foil was neatly attached only to the lower surface of the string (photo 8).

It must be added that foil printing is more successful on surface treated leather. The moisture escaping from the vegetable tanned leather can make the adhesion of the foil uneven and can cause it to ripple. This in turn causes an uneven and uncontrollable result. The latter can be avoided by using a thicker printing plate. When using leather with a moisture-resistant surface finish (regardless of the tanning method), the effect of moisture on the foil decreased, and hence the importance of the thickness of the printing plate in the success of the print (photo 9). Foil printing is successful on leather with a layer of dye but not on oiled surfaces.

The second line of research in this artistic development, alongside testing materials and techniques for producing the printing plate, we also tested the suitability of the ratios between design of pattern motifs and background in reverse printing. When creating designs it became important to

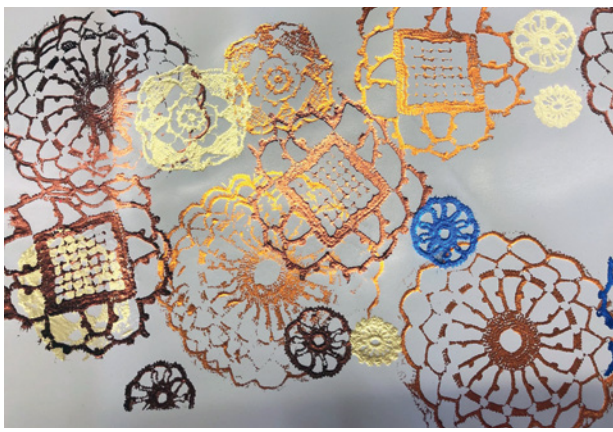

Photo 9. Reverse print with various coloured foils on coated white leather. Crocheted textiles were used as the printing plate. *Photo by Eve Kaaret.*

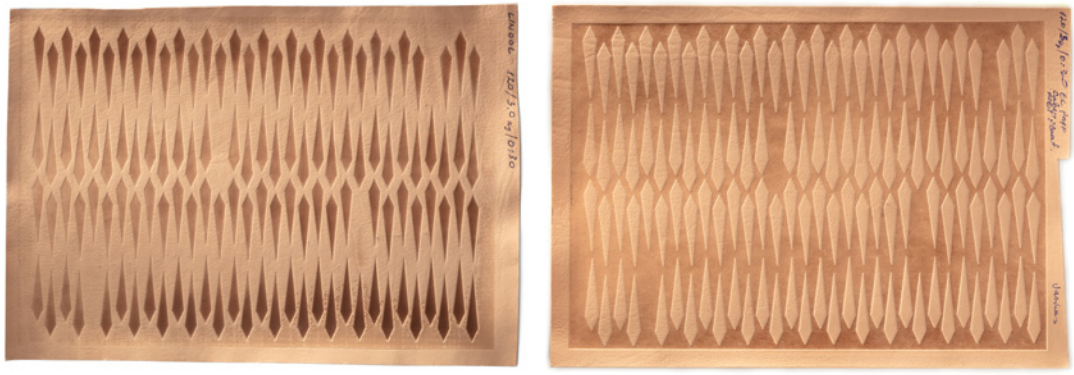

Photo 10. Reverse print on vegetable tanned leather: on the left, the resulting print made with laser engraved linoleum, and on the right, the same pattern printed with laser cut electrical insulation cardboard. In the first case, the pattern is darker and pressed into the surface, and in the second case, vice versa, the background is darker and pressed into the surface. *Photos by Tobias Tikenberg.*

consider the printing plate technology. We investigated how to create a surface design with a low relief pattern or a low relief background, so that the design dominates and emphasises the natural texture of the leather (photo 10).

We experimented with a linear geometric design, which consists of intersecting lines about 2 mm wide and then continued with a tightly arranged network design of simple elements (photos 4 and 5). The goal was to achieve a dominating design that would emphasise the natural texture of the leather on the subtle indented background. The printing results showed that on both regular and asymmetrical designs the darker background created a closed and limited composition. This means that it is best to use the network design on a printing plate either on a smaller detail than the plate so the design covers the whole area of the detail or the design is intended to partially cover a specific product or as a single decorative motif. An effective result was produced from printing plates where both the design and the background are, at first glance, equally balanced and one of them forms an interconnected network (photo 11). The unsuccessful laser cutting of the latter design and the printing test showed that it is also possible to design patterns where the receding background forms the majority of the printed surface.

In the design experiments we came up with an example of how to create a design file with single elements that could be laser-cut in such a way that the details are compact, but fit into each other. It enables to economise on material and time, and makes it possible to form combinations of design elements to create very different designs (figure 12).

As the third aspect of the research, we wanted to expand the range of printable materials. We started reverse printing experiments on undyed vegetable

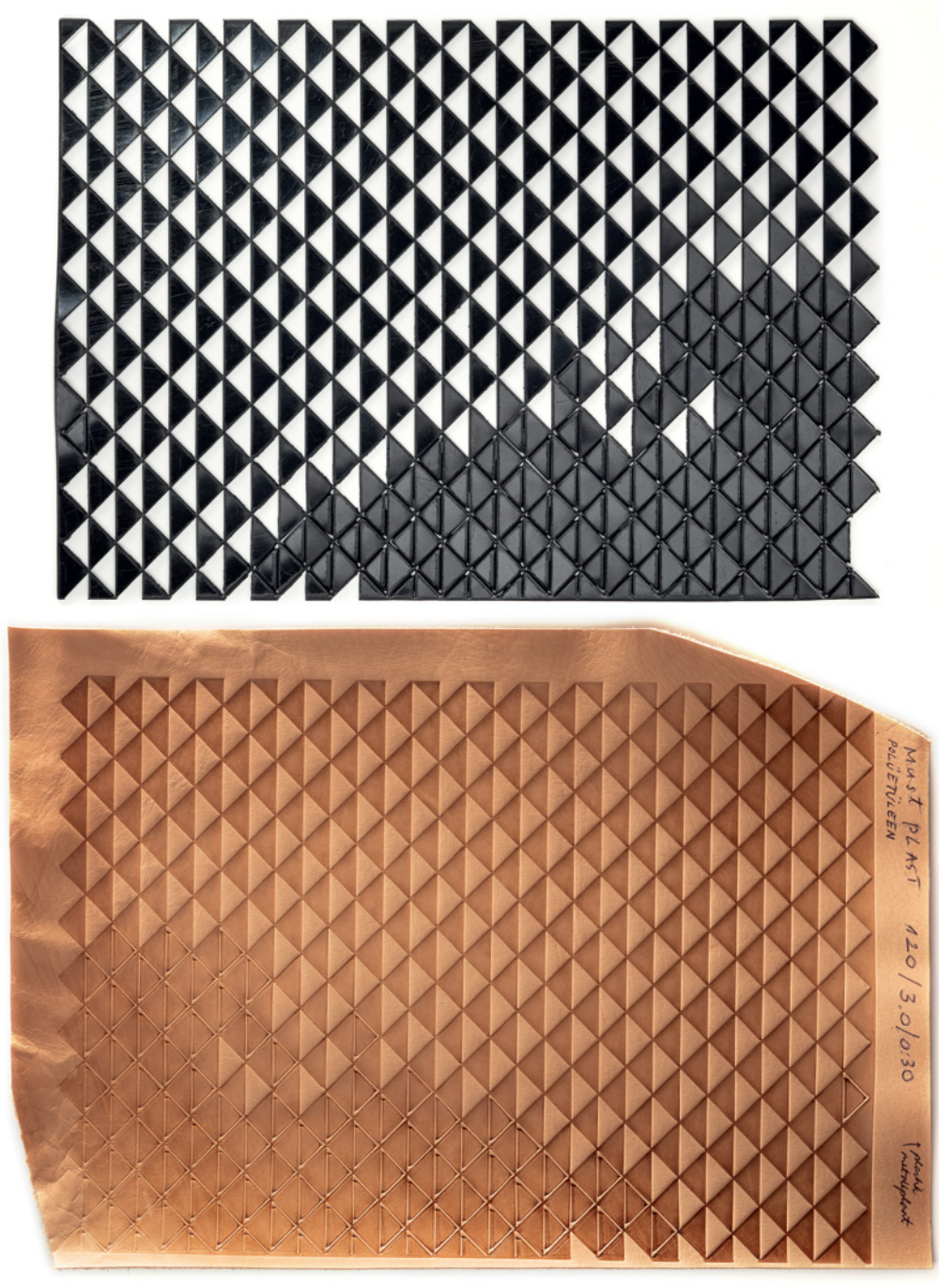

Photo 11. Printing result with a laser cut plate. Above: laser cut polyethylene printing plate, on which both the design and the background are equally balanced. Below: the result of its reverse print on vegetable tanned leather. Unsuccessful laser cut (details could not be removed because of melting during the laser processing) presented the possibility to create designs where the receding background forms the majority of the printed surface. *Photos by Tobias Tikenberg.*

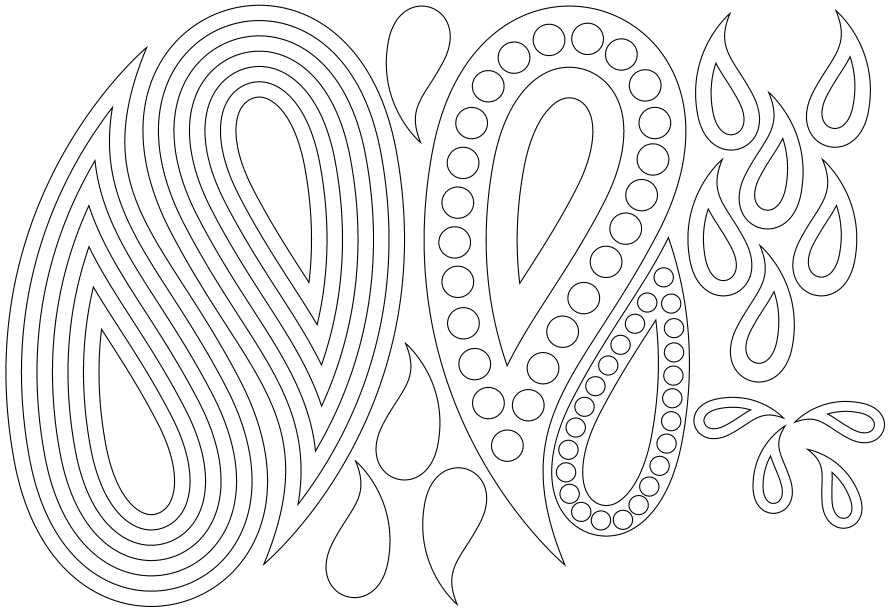

Figure 12. An example of a design file for laser cutting consisting of single elements.
Image by Riina Samelselg.

tanned sheepskin and roe deer leather with no surface treatment. After successful tests using a setting suitable for goatskin and cowhide (1500 N/ 30 sec/ 120° C), we extended the choice of materials to other tanning and surface treatment methods, only varying the design type and material of the printing plate. We used leather that had been tanned using synthetic, mineral and chrome tanning methods. We tested split, top grain (nubuck) and full grain leathers. The degree of surface treatments varied from aniline coating, to nappa and a patent finish. In summary, it can be said that reverse printing is successful on most leathers. In general, in the case of a linear design the relief is deeper, but is also clearly visible when roughly half of the surface is depressed (photo 13).

The gloss and colour contrast depends on both the surface treatment of the leather itself and the material of the printing plate. The smooth surface of the printing plate (i.e. plastic or clear laminate film covering the plate) promotes gloss on the recessed part of the pattern. Consequently, the recessed parts of leather with a matte surface become glossy. The opposite is also possible; a plate covered with laminate film with a textured or matte surface will produce a matte finish on glossy leather. In the case of leather with little or no surface treatment there will be variations in tone. The recessed area will be darker than the rest of the leather surface. The contrast is also strong in the case of sanded or split leather surfaces. With split and nubuck, the design

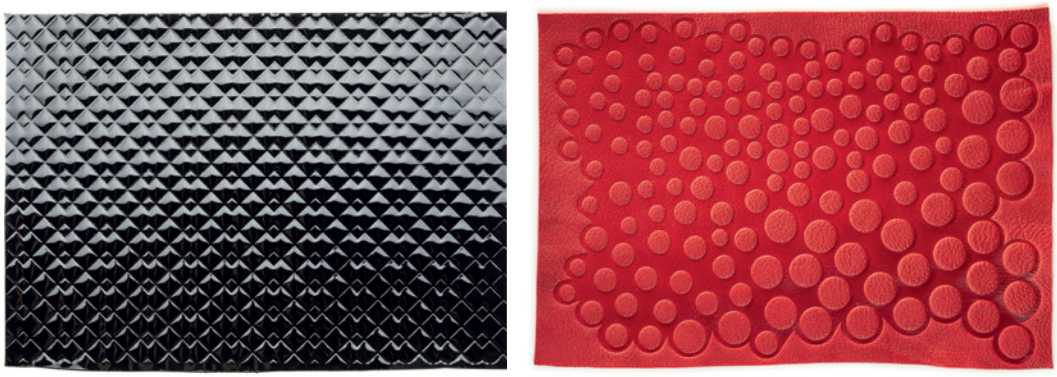

Photo 13. Reversed print on various leathers: on the left, the reverse print on mineral tanned Vernis cowhide with a patent finish, and on the right, vegetable tanned Malaga goatskin with a semi-aniline finish. *Photos by Tobias Tikenberg.*

stays velvety, like the original leather texture, but the background is pressed smooth and shiny. In the case of leather that is less tolerant of heat, tonal differences may arise from the burning of the leather surface, in other words, the design is lightly burned (photo 14).

After successful experiments with different types of leather, we continued the experiments with leather-like materials. The choice of materials was determined by our field – we preferred materials that are easily available and can be used in a similar way to leather. They had to be materials that are possible to sew and glue, they had to retain their shape and be resistant to moisture and fluctuations in air temperature. They had to be suitable as a finishing material, such as a covering material for books, or as an independent material

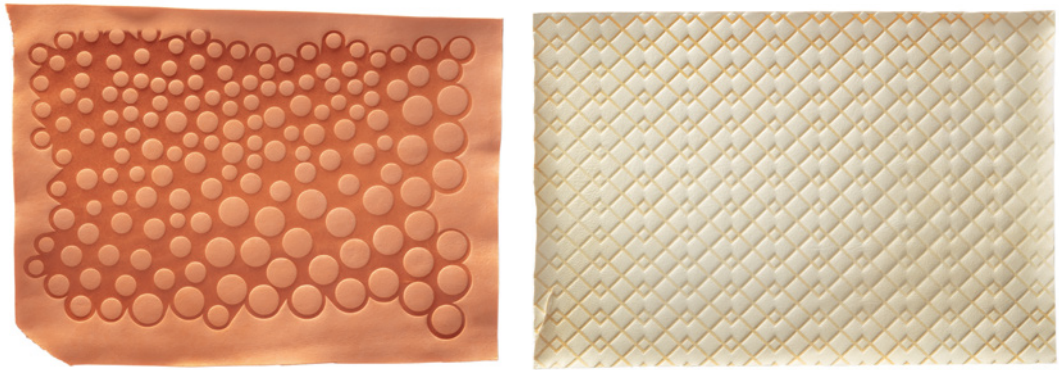

Photo 14. Reversed print on leather with little or no surface treatment: on the left, a reverse print on Biocuoro synthetic tanned biodegradable cowhide with a nubuck finish, and on the right, a reverse print on Chevre Stabilisee goatskin tanned with alum. The pattern background on nubuck has turned into shiny and smooth surface without velvety texture. The alum tanned leather has no surface treatment to protect it from heat and therefore the pattern is slightly burned into the surface. *Photos by Tobias Tikenberg.*

for creating new products, such as bags. In order to increase the potential for comparing results, in all the experiments we used a printing plate made of MDF covered with the same laminate film.

Relief printing of felt, washable paper and cork fabric did not give strong results. Printing is possible technically, but the relief is faint, and after printing, the material does not retain its form. The blurring of the relief is accelerated by subsequent physical manipulation, such as bending, crumpling and stretching. The visibility of the relief and design is also reduced by the textured and crumpled surface of the materials. If desired, the pattern can be printed using foil – in the result it is primarily the colour of the foil, not the relief that is visible.

When choosing textiles, we based our selection on their suitability for making accessories; therefore, most of the ones used in the tests were mixed fibre or composite materials. In total, we tested 8 different fabrics. By fibre composition there were PU and PVC-based polyamide fabric, PVC-based polyester and nylon fabrics, and to increase water resistance polyester fabric covered with a layer of polyethylene. The selected fabrics were with different thickness but strong, stiff and non-stretch. The addition of adhesive cloth and polyethylene foam did not help to produce or maintain the relief effect. The adhesive cloth is used in the clothing industry, and the PE foam in the bag industry to increase the shape retention of the material. We placed the adhesive cloth loosely on the fabric, so that it became attached to the fabric with heat during the printing process. We hoped that by stretching the material layers separately we could create a deeper relief, but neither the addition of fibre or knitted adhesive cloth helped to significantly increase the relief of the non-stretch fabrics. When we added polyethylene foam we used the kind with an adhesive layer and stuck the foam to the fabric before printing. Comparing foam of different thicknesses (1 mm and 3 mm) showed that the relief occurs on the materials mainly due to the compression of the foam section and is stronger when using thicker foam. Subsequent mechanical tests, however, proved that the relief remains stable and does not fade only when using a combination of materials where a strong adhesive bond is maintained under the hot press. We achieved the cleanest and most durable relief result by combining 0.4 mm PVC-based polyamide fabric and 2 mm polyethylene foam. We got an equally good result when combining the same polyethylene foam with non-woven fibre fabric (photo 15).

The experiments with non-woven fibre fabric, which is both an aid in production and post-production waste material used in the furniture industry, led us to the last stage of the artistic development. The aim was to test reverse printing on recycled materials that would be suitable for bookbinding and accessories. First, we tested bonded leather with various thicknesses and surface finishes. Bonded leather is a sheet material pressed from scraps

Photo 15. The best results of the reverse print on fabric: on the left, 2 mm polyethylene foam reinforced PVC base polyamide fabric, and on the right, polyethylene foam reinforced non-woven fibre fabric. *Photos by Tobias Tikenberg.*

of leather and adhesive, which depending on the thickness and degree of stiffness, can be used to make a wide variety of products. Tests showed that the best and most effective result was obtained on uncoated bonded leather, where the dark coloured design appeared on both sides of the material, thus enabling double-sided use. Printing experiments on interior side of packaging provided interesting and effective results. We tested coffee and dog food packages with a moisture-proof inner layer. For example, conventional 1500 N/ 30 sec/ 120° C printing with a thin cotton fabric between the packaging and the press produced a high relief with an uneven texture on a smooth matte silver surface, but applying double-sided tape to the same type of packaging to facilitate further processing produced a glossy silver surface with a silver low relief matte finish when printed (photo 16).

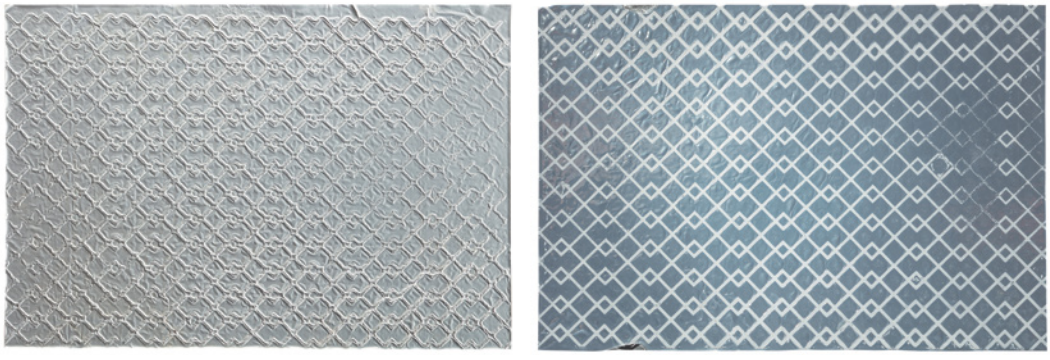

Photo 16. Reverse print on recycled materials: on the left, Luxus coffee packaging, and on the right, Polaris dog food packaging. The result of the print was dependent on the thickness and rigidity of the material – the lighter the material, the deeper the pattern on the material. *Photos by Tobias Tikenberg.*

Summary

The results of the artistic development confirm that reverse printing has many advantages over conventional relief printing. It is convenient to use for prototyping, making one-off and small-run products because a wide range of reusable and recyclable materials can be used for the printing plate. The price, time invested and environmental impact of cutting out the pattern is significantly lower compared to conventional printing methods. Recyclable and waste materials such as MDF board, plastic or cardboard are suitable for the printing plate. Depending on needs and skills, various technologies, ranging from manual to digital, can be used for the production of the printing plates. Reverse printing is also an affordable option for relief printing large format designs compared to the costs of etching cliché or linoleum cutting.

Reverse printing can be used on leather materials with a defective surface. The relief and tonal differences liven up a plain or smooth surface, but can also hide surface defects and inaccuracies. With the help of patterning, it is even possible to enliven and personalise recyclable materials such as coffee packets or other packaging.

Reverse printing also has unresolved shortfalls in this current development phase. Due to wear or deformation the printing plates used so far do not allow for mass production. Therefore, for printing larger editions, several printing plates must be prepared in advance. However, the production of plates is quick and cheap, and the material used for the plates is a resource that can be collected and reused. The tests so far show that reverse printing is very suitable for decorating, either across an entire surface of a material or as motifs, but the solutions that allow precise placement to achieve a calculated result have not yet been developed.

So far, the project results provide the basis to claim that when using reverse printing, it is possible to foil print images using any material that can withstand pressure and heat. It means, that ready-made items and designs are suitable as printing plates. This technical nuance simplifies the use of relief printing and widens up the possibilities to apply décor on bookbinding and accessory design items.

The wide selection of printing plates and printable materials for reverse printing, as well as the methods of producing printing plates, allows the technique to be further developed and adapted according to skills, material preferences and needs.

This example of the artistic development of reverse printing confirms that creative and experience-based systematic development has the potential to adapt traditional craft techniques to meet the demands and needs of the

contemporary creative industry. On the one hand, it values in-depth mastery of techniques, but also provides opportunities to those with less experience to repeat the outcomes and put them into practice. On the other hand, it creates a continuity, a translation or interpretation, so to speak, that connects the old with the new and the past with the future.

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Photo by Meeli Küttim.

Loovarenduse võimalustest rekonstruktsioonist lähtuva tagurpiditrüki näitel

Resümee

Artikkel tutvustab loovarenduse rolli ja võimalusi käsitöötehnikate kaasajastamisel ning kasutab näitena Eesti Kunstiakadeemias läbiviidud praktikapõhist uurimust "Ajaloolise reljeeftrüki rekonstrueerimine ja loovarendamine". Loovuurimus võimaldab süsteemselt eksperimenteerides uurida nii vanu käsitöötehnikaid kui ka arendada neid vastavalt kaasaegsele kontekstile, vajadustele ja võimalustele.

Artikli aluseks olevas uurimisprojektis keskendusime 1924. aastal Eduard Taska ateljees kasutatud nahakaunistustehnika rekonstrueerimisele ja loovarendamisele. Artikkel annab kokkuvõtliku ülevaate senini tundmatu ajaloolise tehnika taustast, selle võimalikult ajastutruust rekonstrueerimisest ning kirjeldab katsetuste tulemusena taasleiutatud tagurpiditrükki. Kui tavapäraselt surub trükipress trükiplaadi vastu aluspinnale toetuva materjali paremat poolt, siis tagurpiditrüki puhul asub trükiplaat aluspinnal mustriga ülespoole, selle peale laotub nahk pinnaga trükiplaadi suunas. Katsetes selgus ka optimaalseim trükipressi seadistus.

Tagurpiditrüki tutvustamise järel keskendub artikkel uurimuse loovarendusele. Selle eesmärgiks oli uurida ajaloolise rekonstruktsiooni edasiarenduste potentsiaali ning kohandada tehnika tänapäevase loomemajanduse vajadustele ning nõudmistele sobivaks.

Artiklist saab ülevaate erinevatest trükiplaadi materjalidest ja trükiplaatide valmistamise meetoditest. Loovarenduse teise uurimissuunana, samaaegselt trükiplaadi materjalide ja valmistamistehnikate testimisega katsetasime mustri ja selle tausta mahu vahekordadele sobivust tagurpiditrükiks. Kolmanda uurimisuuna eesmärk oli laiendada trükitavate materjalide valikut, mistõttu võrdlesime trükitulemusi erinevatel nahkadel ja nahasarnastel materjalidel. Taaskasutusmaterjalidest õnnestus trükk pinnakatteta pressnahal ja niiskuskindlate pakendite ühevärvilisel siseküljel.

Loovarenduse tulemused kinnitavad, et tagurpiditrükil on tavapärase reljeeftrüki ees mitmeid eeliseid. Seda on mugav kasutada prototüüpimiseks, ainukordsete või väiketiraažiliste toodete valmistamiseks. Tagurpiditrükk on ka soodne valik suureformaadiliste mustrite reljeeftrükkimiseks ning seda saab kasutada materjali pinnadefektide ja ebatäpsuste varjamiseks. .

Võtmesõnad: loomeuurimus, nahakunst, reljeeftrükitehnika, tagurpiditrükk