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|  | **Module E (Analysis Task 5)** |
| In each of the abstracts below, identify the sentence(s) that provide the following elements:1. **introductory** information
2. the **purpose** of the research.
3. the **methods** or **procedures** used to achieve the aims of the research.
4. describe the **results** or **"product"** of the research.
5. general **conclusion** drawn from this research.
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| Move **1:** Introduction Establishes context of the paper and motivation for the research.1. **Arguing for topic prominence** (“Centrality claim”)
2. **Making topic generalizations**
3. **Defining terms, objects, or processes**
4. [**Identifying a problem or gap in current knowledge**](http://kiepc10.cc.tut.fi/~english/kirjoittamo/awe/style/reporting/sections/abstracts/model/main.html#problem)

**Move 2:** Purpose Outlines what the study seeks to achieve or create in terms of the aims, research questions or tasks.**Move 3:** Methods Provides information on study design, procedures, assumptions, research approach, data collection, materials, equipment and test environment.**Move 4:** Results / Contribution States either the main **outcome** of a **design process** (e.g., system, model, method, tool, process, framework) or **knowledge** (experimental results) identified to improve future engineering solutions.**Move 5:** Conclusion Interprets or extends results beyond the scope of the paper, draws inferences, points to new applications, or wider applications.1. **Deducing conclusions from results**
2. **Evaluating value of the research**
3. **Presenting recommendations**
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Tomas Their, “In-Plane Stiffness and Strength of the Snub Square Lattice,” M.S. thesis, School of Engineering, Dept. of Aeronautical Engineering, Aalto Univ., Espoo, Finland, 2017.

 **SENTENCE NUMBER**

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| A | **A****1**Lightweight materials are an important aspect of modern engineering, and the field is constantly expanding. **2**Lattice materials are often used when designing lightweight structures, either on their own or as e.g. core materials in sandwich structures. **3**Regular lattices are used extensively, and their properties have been studied thoroughly. **4**Semi-regular lattices, on the other hand, have not been studied as much, and only the properties of the Kagome lattice are known. **5**Nevertheless, the mechanical properties of the semi-regular Kagome lattice are very good, which is a reason to study other semi-regular lattices. **6**This thesis determines the in-plane stiffness and strength of the snub square lattice and compares them with previously known properties of other stretching-dominated lattices. **7**The properties are calculated using analytical modelling, finite element simulations, and experimental tests. **8**The results obtained through these methods are compared to verify their feasibility, and the analytical results are compared with the properties of other lattices. **9**The results show that the applied methods are feasible. **10**The finite element simulations and experimental tests also show that imperfections in the lattice result in a lower buckling strength, and that the lattice is very sensitive to imperfections near the critical relative density where the collapse mode changes from elastic buckling to yielding. **11**When comparing the mechanical properties of the snub square lattice with those of other lattices, the snub square lattice has an inferior stiffness and yield strength, but a favorable buckling strength. **12**The buckling strength is material specific, so the snub square lattice would be a feasible solution when stiffness is not important and the solid material has a high yield strain, thus resulting in a higher critical relative density. **13**In addition, the positive results are seen as motivation to study further properties of the snub square lattice, as well as other semi-regular lattices. | 1. Click to enter Move-Step.
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Bijan Bayat Mokhtari, “[Development of an Intelligent Safety Gear System for High-Rise Elevators](https://drive.google.com/file/d/1auGzPW6M2-qwIsb-MV-ApaZBs2w8Cv1v/view?usp=sharing),”
M.S. thesis, School of Engineering, Dept. of Mechanical Engineering, Aalto Univ., Espoo, Finland, 2017.

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| B | **B** **1**Elevators have been a key element of buildings, especially tall buildings, since their widespread use began in the 19th century. **2**As a matter of fact, high-rise buildings would not have existed without elevators. **3**Elevators have a myriad of safety features and devices to ensure a safe journey for the passengers. **4**One of these devices is the safety gear. **5**Safety gears are emergency brakes that stop speeding elevators by gripping the guide rails. **6**They are adjusted for a safe deceleration range by the technician during installation and exert a constant force. **7**Due to their purely mechanical nature, once triggered, the safety gear is currently unable to actively adjust the braking force to counteract vibrations, to decelerate at different rates, or to stop the elevator at the closest landing. **8**Therefore, the emergency braking event can be harsh and noticeable, leaving the passengers stuck in the elevator shaft after the braking event. **9**This thesis aims to develop an intelligent safety gear system that is able to bring the elevator to a stop with a safe and adjustable deceleration rate. **10**This was achieved by first, modeling a computer simulation of a small-scale elevator to be able to quickly simulate different braking event scenarios. **11**Second, a small-scale elevator test rig was constructed to test the computer simulation with physical components. **12**The test rig was validated by comparing its results with KONE’s high-rise safety gear test. **13**The control system developed was able to safely stop the moving mass with the desired deceleration and a great deal of control over other parameters. **14**Further development of the system could lead to a safer, more comfortable, and energy efficient elevator ride. | 1. Click to enter Move-Step.
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Topi Hirvonen, “**Thermal paper reuse in thermal paper base paper manufacture**,” M.S. thesis, School of Chemical Technology, Helsinki University of Technology, Espoo, Finland, 2007.

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| **C**1Leuco dyes, developers and sensitizers have been identified as components that can hinder the recycling of thermal paper. 2The presence of these components in the manufacturing process of thermal base paper can adversely affect the final paper quality and result in a loss of brightness, colour spots, deposits and gummy residues. 3However, no research has yet addressed the problem of deinking thermal paper. 4The objective of this thesis was to develop and test a technology that would enable Jujo Thermal Ltd to purify their thermal paper. 5The firm needs to reuse this purified thermal paper as a thermal base paper raw material.6The thesis investigates two alternative purification processes: hyperwashing and hyperflotation. 7Both processes were simulated under laboratory conditions. Hyperwashing was assumed to correspond to pressurised screening. 8Hyperwashing was performed using Bauer-McNett fiber classifier and hyperflotation was conducted with a Voith Delta25 laboratory flotation cell. 9In both processes, washing and flotation were found to be effective in purifying the stock. 10Hyperwashing was able to remove 85% of the leuco dyes, with a yield ranging from 60% to 65%. 11In contrast, Hyperflotation was less effective than hyperwashing in removing small leuco dye particles, though it yielded higher ash concentrations. 12The hyperwashed pulp was found to have no significant effect on the optical properties or strength values of laboratory sheets containing precoated thermal paper mass fractions of less than 20%. 13Neither process induced any colour spots in the laboratory sheets. 14These promising laboratory results clearly support expanding these studies to mill-scale trials. 15Jujo Thermal Ltd should start pilot trials with flotation, since flotation would produce less waste water than either washing or pressured screening, and would require no further internal water purification, such as DAF (dissolved air flotation). | 1. Click to enter Move-Step.
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Hänninen, Topi, **“Sprayable membranes and thin support liners for waterproofing facilities in hard rock,”** M.Sc. thesis, School of Engineering, Aalto University, Espoo, Finland, 2017.

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| **D****1**Various lining structures have been used in challenging underground projects around the world for decades, though these lining structures have rarely been applied in Finland. **2**Despite the unreliable outcome of pre-grouting, it is regarded as the only cost-effective method for waterproofing an underground facility. **3**Nevertheless, new sprayable lining solutions might increase adoption of this method. **4**An important feature of these new sprayable lining solutions is the spray-applied waterproofing membrane. **5**In order to evaluate the feasibility of these sprayable lining solutions, this thesis defined and tested under field conditions the waterproofing characteristics of two lining structure materials produced by Normet Oy: a sprayable waterproofing membrane TamSeal 800 and a waterproof thin support liner TamCrete SSL. **6**Field tests showed that although both TamSeal 800 and TamCrete SSL provide powerful waterproofing layers, the application phase is crucial, requiring careful preparatory work as well as precise implementation of the other working phase. **7**For example, active water ingresses should be removed beforehand. **8**TamSeal 800 had much longer drying times than was expected. **9**All in all, it was found that the new sprayed linings do offer interesting opportunities, even though they do not completely remove the need for pre-grouting. **10**Thus, pre-grouting continues to be important, especially when there is a need for controlling the groundwater level. **11**Future projects with strict sealing requirements should test waterproof linings with spray-on membranes because of the potential benefits achievable with these lining structures. **12**Therefore, it is recommended that future projects first pre-grout the facility and afterwards build the lining structure in order to determine the overall cost-effectiveness of these linings. **13**TamCrete SSL is a promising product, though the good waterproofing characteristics seem to be secondary in comparison with the strength properties. **14**Before larger applications, the exact strength properties should be determined. **15**Future research should also assess the potential use of TamCrete SSL to replace sprayed concrete as a permanent support structure, since this feature determines the full extent of the applications for this product. | 1. Click to enter Move-Step.
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Bock, Wilfried, “**Lead User Analysis for the Development of Shape Changing Interfaces**,” M.Sc. thesis, School of Engineering, Aalto University, Espoo, Finland, 2017.
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| **E****1**Various **1**The majority of flexible interfaces developed to date are **only** capable of sensing binary values that represent touch, and have a low actuation pressure. **2**Most interfaces that allow for variable pressure input are either excessively complex from a technical standpoint, or do not support multi-touch. **3**To overcome these problems, this thesis explores the idea of a multi-touch, variable-pressure input technique. **4**Additionally, the thesis describes the steps followed to develop the technique, the process followed to find a potential use case, and the suitability of the studied users as lead users. **5**Subsequent to the development of the sensing technique, potential use cases were explored for applying the technique as an input device for smartphones. **6**The targeted users consisted of cyclists who actively use smart device for tasks such as fitness tracking and navigation. **7**Eleven expert users and 11 everyday users were individually interviewed in context, and an experiential prototype was built for use in the interviews. **8**The prototype was designed to address the interface-related needs inferred from the initial insights by the expert users. **9**Later analysis showed that 2 of the 11 expert users exhibited typical lead user characteristics, supporting the claim that expert users in general offer a much greater wealth and depth of insights compared to everyday users. **10**From a further survey, it was found that the needs found through contextual interviews were latent for 1 in 7 of the 104 surveyed everyday cyclists. **11**The study shows that although expert users are in general a good place to start with the need-finding process, the chance of finding lead users among experts is still quite low. **12**Method-related recommendations for future work include looking for extreme cases among expert users and involving a design team to enrich the need finding process, rather than mainly relying on individual work. **13**Since all needs identified through expert user interviews were found to be important by a significant number of everyday users, a set of recommendations are presented concerning the direction that future developments should take to address each of these needs. **14**The most significant of these needs is the accidental input recognition, since it is both latent and not already addressed by current commercial products. | 1. Click to enter Move-Step.
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