Circuit: Jurnal Ilmiah Pendidikan Teknik Elektro
Volume 9 No. 1 September 2024 - February 2025
ISSN: 2549-3698; E-ISSN: 2549-3701
DOI: 10.22373/crc.v9i1.27740

Design and Construction of an Electric Whip for the Implementation of Criminal Law in Aceh

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Submission: 17-12-2024 Accepted: 20-01-2025 Published: 24-02-2025

Abstract

According to Qanun Jinayat, caning punishment in Aceh needs to be applied in a way that is both efficient and quantifiable. Designing an electric machine-based whipping device that controls the voltage (between 100 and 150 volts) according to the device's strength is the goal of the study. Using an experimental approach, this study displays the outcomes of 10 lashes at 100 volts for 10 seconds. It just takes 4.38 seconds at 150 volts. The punishments of khalwat (10–30 lashes), khamar (40–60 lashes), and zina (100 lashes) were used to test the system. The Aceh Jinayat law's concepts of justice and welfare are used to adjust the tension to the convict's circumstances. It is anticipated that this specially made whipping machine will be the most appropriate and compassionate way to administer caning punishment in Aceh. Therefore, this design provides a quantifiable, quick, and efficient method without disregarding the humanitarian element in Aceh's application of Islamic law.

Keywords*: Whip, Machine, Electricity, Sharia*

Abstrak

Pelaksanaan hukuman cambuk di Aceh sesuai Qanun Jinayat membutuhkan metode efektif dan terukur. Penelitian bertujuan merancang alat cambuk berbasis mesin elektrik yang mengatur tegangan (100–150 Volt) yang disesuaikan dengan kekuatan alat cambuk. Penelitian ini menggunakan metode eksperimen dan menunjukkan hasil pada 10 kali cambukan dengan tegangan 100 Volt waktu 10,00 detik. Sedangkan pada 150 Volt hanya 4,38 detik. Sistem diuji pada hukuman khalwat (10–30 cambukan), khamar (40–60 cambukan), dan zina (100 cambukan). Waktu pelaksanaan berkurang seiring peningkatan tegangan, misalnya untuk khalwat dari 22,72 detik di 100 Volt menjadi 13,75 detik di 150 Volt, dan untuk zina dari 1 menit 22,56 detik menjadi 1 menit 10,88 detik. Meskipun semua uji dinyatakan berhasil, tegangan 145–150 Volt menyebabkan rotan bengkok pada 100 cambukan, memerlukan perbaikan agar alat dapat berfungsi konsisten. Penyesuaian tegangan disesuaikan pada keadaan terpidana dengan asas keadilan dan kesejahteraan dalam hukum Jinayat Aceh, Mesin cambuk rancangan ini diharapkan menjadi solusi tepat dan manusiawi bagi pelaksanaan hukuman cambuk di Aceh. Dengan demikian, rancangan ini menawarkan pendekatan terukur, cepat, dan efektif tanpa mengabaikan aspek kemanusiaan dalam pelaksanaan syariat Islam di Aceh.

Kata Kunci: Cambuk, Mesin, Listrik, Syariah

Introduction

Aceh Province has long been known as an area where its people have a close relationship with Islam and the principles of Islamic law. Therefore, Aceh Province cannot be separated from the Islamic aspect because the majority of the population of Aceh Province is Muslim and is known as the Veranda of Mecca. The people of Aceh have upheld Islamic law as the main guideline in their daily lives, a tradition that has persisted since the glorious era of the Aceh Sultanate. During that time, the sultans implemented Islamic law firmly and fairly, without discrimination based on social status or personal background. This is reflected in the strong presence of Sharia values across various aspects of life [1]. The implementation of Islamic law in Aceh has been in effect since the enactment of Law No. 44 of 1999 and Law No. 18 of 2001, which granted Aceh broad authority to govern its own region, including the application of Islamic values in community life [2]. Since Islamic law is a part of Aceh Province's relationship with Islam, it makes sense that Aceh Province would apply Islamic law. The implementation of Islamic law in Aceh requires thorough revitalization and holistic reform [3]. In the context of Aceh Province, Islamic law cannot be separated from jinayat regulations and jinayat legal procedures which are important sources of material and procedural law in the implementation of Islamic law in Aceh Province [4].

The Jinayat Law applied in Aceh province regulates various types of punishments, one of which is caning. This punishment is carried out for certain violations in accordance with sharia law. This punishment is intended not only as a form of legal consequence but also as a deterrent, and encourage individuals to think carefully before committing a violation [5]. The manual implementation of caning by officers often faces challenges related to the consistency of the strength of the blow, which can affect the fairness of the sentence and the potential for injury to the convict. In addition, the physical fatigue factor of officers can affect the quality of the execution [6].

From the results of the research questionnaire and direct interviews conducted by the researcher with one of the caning law executioners in Aceh Province, it was revealed that the implementation of jinayat punishment was influenced by the physical and psychological conditions of the officers. Officers reported that the stability of the implementation of the punishment often depended on the facial expressions of the convicts being caned, which could affect their emotions during the execution process. In addition, officers also admitted to experiencing physical fatigue, so that the strength of the caning tended to decrease over time during the implementation of the punishment.

In an effort to improve the quality of the implementation of the caning law, innovation is needed in the form of an electric-based whip that is able to deliver blows consistently and safely. This tool is expected to replace the manual method currently used by executors, so that the implementation of punishment can be carried out more effectively and efficiently.

Literature Review

Relevant studies related to the implementation of criminal law in Aceh, by Fadlullah, Nyak. "Positivization of Islamic Law and its Interaction with Ethnonationalist Groups in Aceh." Asy-Syir'ah: Journal of Sharia and Legal Sciences (2020). Sharia and

Social Engineering: Implementation of Islamic Law in Contemporary Aceh, the implementation of the caning punishment was first carried out in Indonesia after the era of the Islamic Nusantara kingdom, on June 24, 2005 in the courtyard of the Great Mosque of Bireun, Aceh province. From 2005 to 2008, the number of perpetrators who violated the Qanun and were given the caning punishment was 275 people. In 2005 there were 101 people, in 2006 there were 61 people, in 2007 there were 58 people and in 2008 there were 55 people [7]. The formal implementation of Islamic law (syariat Islam) in its entirety began in 2001 in Aceh, and since then, it has continued to spark both support and opposition [8].

In the relevant study of Ananda A. Tumbol et al. (2021) a legal study of the punishment of caning in the province of Aceh from a human rights perspective, the meaning of the word whip according to the Big Indonesian Dictionary (KBBI) is a tool for whipping animals (horses, buffaloes, etc.) in the form of a rope made of plant fibers, thread or leather tied to a handle, a large whip, while "whipping" or "whipping with a whip" is treating someone harshly as a lesson to become more active or obedient [9]. Whip also known as *Rotan kesur*, which holds symbolic meaning as a representation of physical and mental resilience [10]. The whipping or rotan is tool for punishment. Basicly, punishment in Arabic is called *uqubah*, which means "to accompany it," referring to an action that follows or accompanies a violation as a form of consequence for wrongdoing, with the aim of deterring the offender from repeating the act [11]. The implementation of caning (whipping/rotan) as a criminal punishment is one of the reform efforts in the criminal justice system that applies the principles of Sharia law [12].

Another study was conducted by Bagus et al. (2021) Faculty of Engineering, In a relevant study related to the implementation of criminal law in Aceh, Aceh Qanun Number 6 of 2014 concerning Criminal Law regulates a number of violations that are subject to caning ('uqubat), with sanctions that vary based on the type of violation. Violations of khalwat (indecent acts) can be punished with up to 10 canings or a maximum fine of 100 grams of pure gold, or imprisonment for up to 10 months Ikhtilath (intimate relations without marriage) is subject to up to 30 canings or a maximum fine of 300 grams of pure gold, or imprisonment for up to 30 months. Zina (sexual relations outside of marriage) for unmarried perpetrators is subject to 100 canings, while liwath (same-sex relations) can be subject to up to 100 canings or a maximum fine of 1,000 grams of pure gold, or imprisonment for up to 100 months.

Violations of khamar (alcohol) are punishable by 40 lashes, while maisir (gambling) can be punished by up to 12 lashes or a maximum fine of 120 grams of pure gold, or imprisonment for up to 12 months. Qadzaf (accusing adultery without evidence) is punishable by 80 lashes, while bughah (rebellion) can be punished by up to 60 lashes or a maximum fine of 600 grams of pure gold, or imprisonment for up to 60 months. Finally, violations of sexual harassment are punishable by up to 45 lashes or a maximum fine of 450 grams of pure gold, or imprisonment for up to 45 months (DSI Aceh, 2014). The application of this criminal law reflects the implementation of Islamic law in the context of the Aceh government, which aims to uphold religious and social norms in the region [13].

The research to be conducted differs from other studies in that it focuses on the design and development of an electric-powered whip that can be used to enforce Aceh's Jinayat law. The purpose of this study is to evaluate the tool's comfort, safety, and efficacy in a number of areas.

Method

In this study, the experimental method is used. The experimental method is a quantitative research approach applied to understand the impact of independent variables (Independent) are factors that are manipulated or regulated by researchers that can affect the results of research on dependent variables (Dependence) are results or effects that are measured or observed, which are influenced by independent variables under controlled conditions [14]. This study aims to design a whip based on an electric machine for the implementation of criminal law in Aceh. This experimental study aims to test the whip and its components.

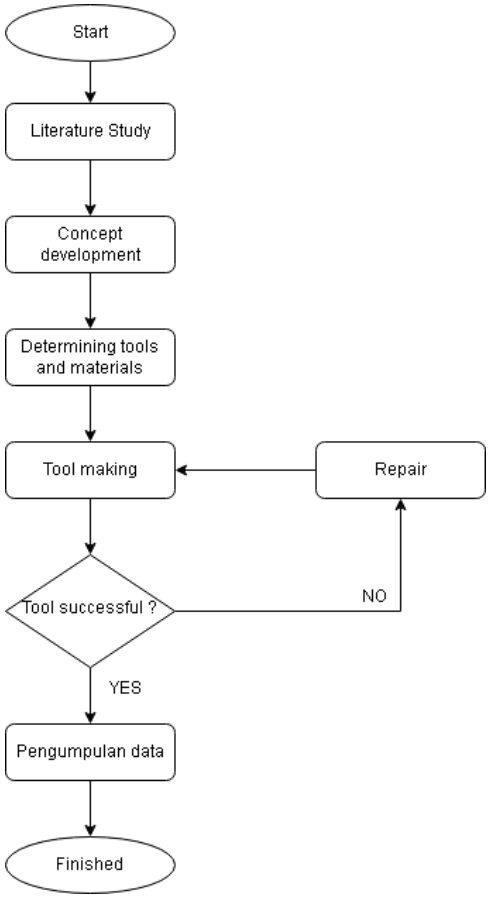

Figure 1. Research Flowchart

The working block for designing and constructing an electric-based whip for implementing criminal law in Aceh can be seen in Figure 2. The working block for designing and constructing the tool.

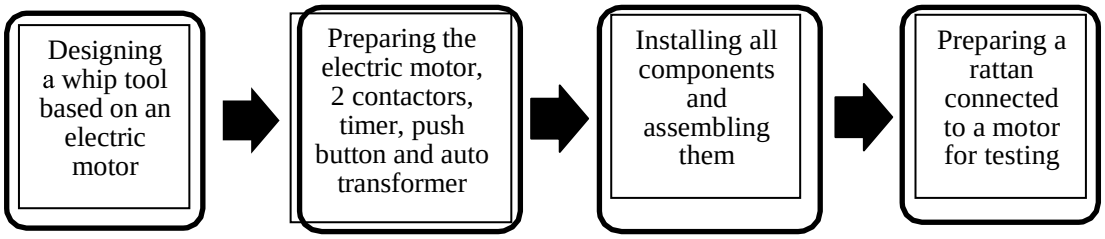

Figure 2. Tool Design Work Block

The electrical laboratory of Ar-Raniry State Islamic University in Banda Aceh was used to design the machine-based whip tool. After the tool's parts were put together and connected with multiple cables, the motor would turn on and rotate the rattan 90 degrees, simulating a whip blow. The tools and materials that will be used in designing the tools and testing are shown in Table 1.

Table .1 Equipment and Materials

Equipment and Specifications		
1 phase motor		Power: 1 phase Power: 2 hp Rpm: 1500
Contactor		Omron Mode:H3BA
Timer		Voltage:250 Power:1kw
Autotrafo		Voltage:220V AC
Whip		Material: rattan Length: 1.20 meters Diameter: 5 mm Weight:100 grams
Push button		Model: XB7-EA1 Voltage:220V AC

The researcher will then create an electric-powered whip for Aceh's criminal law application, as shown in Figure 3, once all the necessary tools and supplies have been gathered.

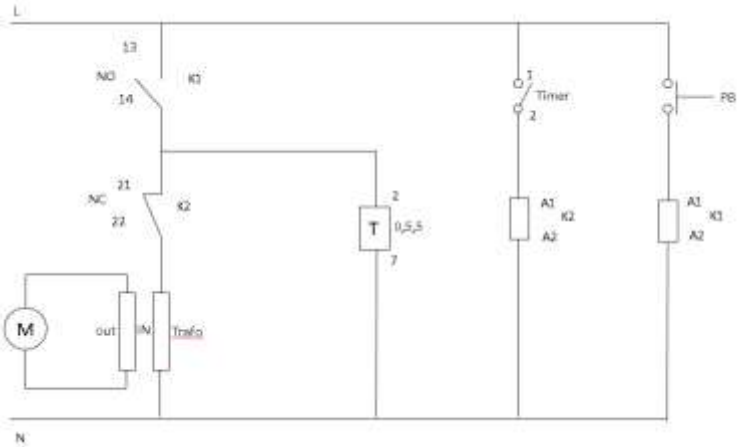

Figure 3. Electric Machine-Based Whip Tool Circuit

In Figure 3, the electric machine-based whip device circuit begins with a voltage source from the PLN current connected to the Normally Open (NO) 13 terminal of contactor K1. From Normally Open (NO) 13, the current is forwarded to the push button (PB), whose output is connected to terminal A1 of contactor K1, while terminal A2 of contactor K1 is connected to neutral. Furthermore, from Normally Open (NO) 14 of contactor K1, the current is flowed to Timer T2 via terminal 2 with the neutral terminal connected to terminal 7.

In addition, Normally Open (NO) 13 of contactor K1 is also connected to Timer T1 via terminals 1 and 3 as a delay switch, where the output terminal 3 of Timer T1 is connected to A1 of contactor K2, while A2 of contactor K2 is connected to neutral. In the Normally Closed (NC) section, the Normally Open (NO) terminal 14 of contactor K1 is connected to the Normally Closed (NC) 21 of contactor K2, and the Normally Closed (NC) 22 of contactor K2 is connected to the auto transformer input, with the auto transformer output directed to the 1-phase motor. The combination of contactors, push buttons, and timers in this circuit allows coordinated control of a 1-phase motor to drive an electric-based whip machine.

Result and Discussion

a. Results of the Design of the Whip Tool

Figure 4 shows the outcomes of the design of an electric-powered whip used to enforce Acehnese criminal legislation. As seen in the image below, the design of an electric-powered whip used to enforce Acehnese criminal code includes wood that is 25 cm in diameter at the top, 30 cm on the left and right sides, and 30 cm on the bottom.

Figure 4. Results of the Design of the Whip Tool

Following design completion, the researcher had to manufacture the electric machine-based whip tool using the schematic depicted in Figure 5.

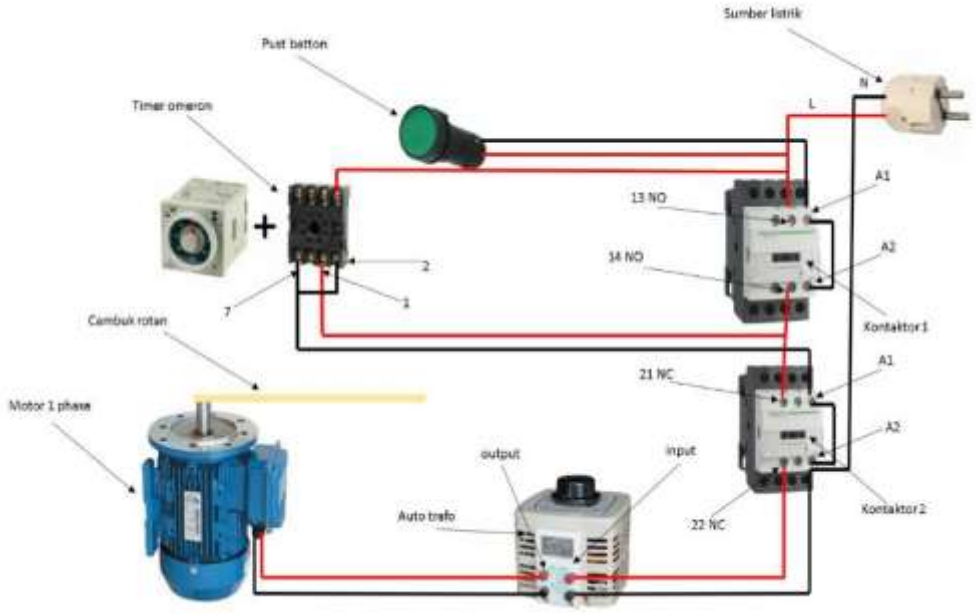

Figure 5 Schematic of How an Electric-Based Whipper Works

In Figure 5, the working schematic of this electric machine-based whip tool begins with a voltage source from the PLN current connected to the Normally Open (NO) 13 terminal of contactor K1. From Normally Open (NO) 13, the current is forwarded to the push button (PB), whose output is connected to terminal A1 of contactor K1, while terminal A2 of contactor K1 is connected to neutral Furthermore, from Normally Open (NO) 14 of contactor K1, the current is flowed to Timer T2 via terminal 2 with the neutral terminal connected to terminal 7. In addition, Normally Open (NO) 13 of contactor K1 is also connected to Timer T1 via terminals 1 and 3 as a delay switch, where the output terminal 3 of Timer T1 is connected to A1 of contactor K2, while A2 of contactor K2 is connected to neutral.

In the Normally Closed (NC) section, the Normally Open (NO) terminal 14 of contactor K1 is connected to the Normally Closed (NC) 21 of contactor K2, and the Normally Closed (NC) 22 of contactor K2 is connected to the auto transformer input, with the auto transformer output directed to the 1-phase motor. The combination of contactors, push buttons, and timers in this circuit allows coordinated control of a 1-phase motor to drive an electric-based whip machine.

After the results of the working schematic of the electric machine-based whip tool are successful, the researcher will install all the components of the electric machine-based whip tool, namely with 2 contactors, timers, autotrafos, push buttons, 1-phase motors and rattan whips as in Figure 6, the results of installing the components of the electric machine-based whip tool.

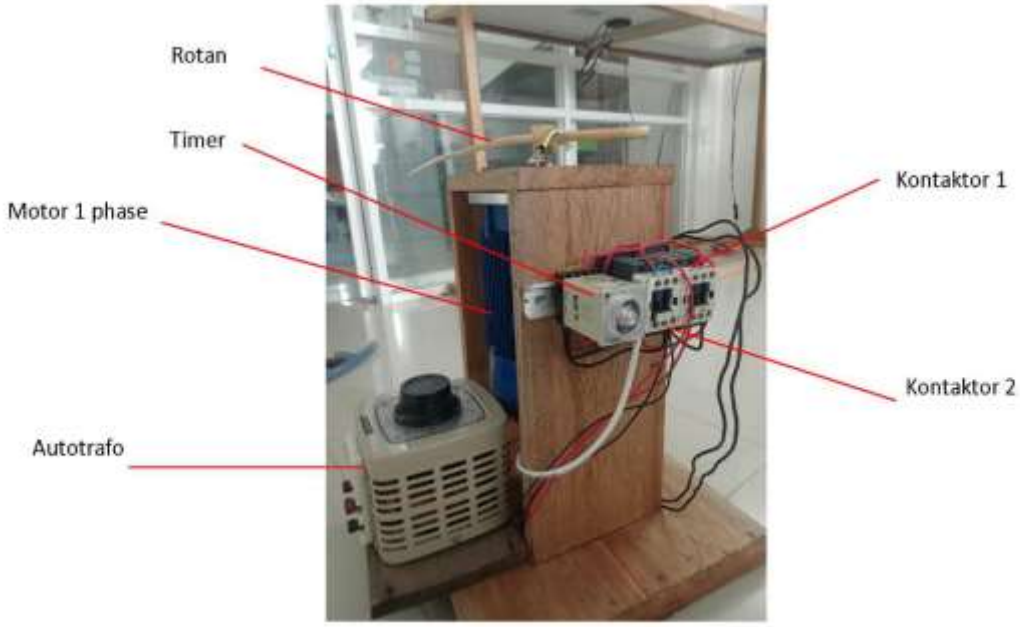

Figure 6. Results of Installing the Components of the Electric Machine-Based Whip Tool

In Figure 6, the results of installing the components of the electric machine-based whip tool are in the form of 2 contactors, an Omron timer, an autotransformer, a batton pusher, 1 1-phase motor and rattan as a whip. The electric machine testing scenario is positioned on a stable stand 50-70 cm above the ground, with the whip direction aligned horizontally and the tip of the whip directed toward a target located 100-120 cm from the machine. The device is designed to produce a whip motion with a cyclical pattern of hitting and returning. The motion is controlled by an electric motor system, ensuring consistent force and rhythm to simulate a standardized whipping action [15].

When activated, the electric machine moves the whip at a controlled speed, allowing the tip of the whip to strike the target precisely at an angle between 0° and 90°. After hitting, the whip automatically returns to its initial position through a stable and efficient control mechanism. The hitting target can be a static object or a test dummy that simulates a human position, where the whip makes direct contact to meet purposes such as physical training, therapy, or simulation. The motion and impact of the device are designed for consistency, precision, and safety as required as shown in Figure 7.

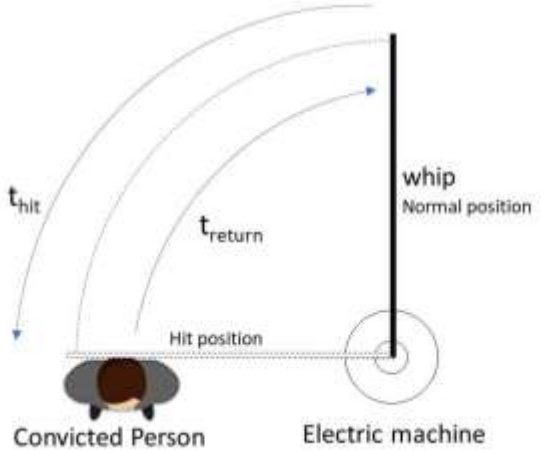

Figure 7. Electric Machine Based Whip Tool Test Scenario

In Figure 7, the test scenario for the electric whip-based whipping tool shows the scenario for the electric whipping tool, the position of the electric machine, the normal position of the whip, the whip hitting, the return, the position of the lash and the position of the person being punished.

b. Results of Testing the Electric Machine-Based Whip Tool

Testing was carried out with variations in voltage (voltage) ranging from 100 volts to 150 volts, where each test was carried out for 10 lashes. In testing the electric machine- based whipping device, it was seen that the electric voltage affected the execution time. At a voltage of 100 volts, the device took 10.00 seconds for 10 lashes, while at a voltage of 125 volts, the execution time was reduced to 8.92 seconds. Furthermore, at a voltage of 135 volts, the time required was 7.32 seconds, and at 145 volts, the time was shortened to 6.88 seconds. At the highest voltage, which was 150 volts, the device only took 4.38 seconds for 10 lashes. All of these tests showed successful results, indicating that the device works more efficiently with increasing voltage, although it is necessary to pay attention to the safety and stability aspects at high voltages.

Table 2. Whip Tool Testing

No	Voltage (v)	Number of lashes	Execution time	Work Tools
1	100 volt	10 x lashes	10,00 seconds	success
2	125 volt	10 x lashes	8,92 seconds	success
3	135 volt	10 x lashes	7,32 seconds	success
4	145 volt	10 x lashes	6.88 seconds	success
5	150 volt	10 x lashes	4,38 seconds	success

Based on the test data, the electric motor-based whipping tool showed an increase in efficiency as the voltage used increased. At 100 volts, the time required for 10 whips was 10.00 seconds, while at the highest voltage of 150 volts, the execution time was drastically reduced to 4.38 seconds. This test demonstrated that at greater voltages, the tool operated more quickly and effectively. Nevertheless, every test produced a "Success" status, suggesting that the instrument could operate reliably at different voltage levels. As a result, raising the voltage worked well to shorten the tool's operating time, although operational stability and safety still require consideration.

With five voltages (voltages) of strength chosen for the electric machine-based whip—100, 125, 135, 145, and 150 volts—the trial's outcomes are intended to ascertain the viability and strength needed for the application of criminal law in Aceh. The testing was carried out on the criminal punishment in Aceh which was taken as a test sample to meet the suitability and shortcomings of the electric machine- based whipping tool, namely 3 types of punishments were taken covering all the lashes of criminal punishment in Aceh from 1 to 100 lashes as in table 3.

Table 3 Results of the Trial of Criminal Punishment in Aceh

No	Types of Punishment	Voltage (V)	Number of lashes	Execution time	Work Tools
		100 Volt	10-30 lashes	22,72 seconds	success
		125 V0lt	10-30 lashes	17,58 seconds	success
		135 Volt	10-30 lashes	16,89 seconds	success

1	Khalwat (immorality/ikht	145 Volt	10-30 lashes	15,88 seconds	success
		150 Volt	10-30 lashes	13,75 seconds	success
2	Kahmar (alcoholic drink)	100 Volt	40-60 lashes	42,32 seconds	success
		125 V0lt	40-60 lashes	37,15 seconds	success
		135 Volt	40-60 lashes	35,90 seconds	success
		145 Volt	40-60 lashes	33,31 seconds	success
		150 Volt	40-60 lashes	30,07 seconds	success
3	Zina (extramarital sexual relations)	100 Volt	100 lashes	1.22,56 seconds	success
		125 Volt	100 lashes	1.17,28 seconds	success
		135 Volt	100 lashes	1.15,48 seconds	success
		145 Volt	100 lashes	1.13,27 seconds	repair
		150 Volt	100 lashes	1.10.88 seconds	repair

We can infer from this data that the electric machine-based whipping device demonstrated enhanced efficiency in conjunction with rising electric voltage during testing. In the violation of khalwat (10-30 lashes), the execution time decreased from 22.72 seconds at 100 Volts to 13.75 seconds at 150 Volts, and all tests were declared successful. For the violation of khamar (40-60 lashes), the execution time decreased from 42.32 seconds at 100 Volts to 30.07 seconds at 150 volts, also with successful results.

In the violation of zina (100 lashes), the execution time decreased from 1 minute 22.56 seconds at 100 Volts to 1 minute 10.88 seconds at 150 Volts. However, the tool needs to be repaired at 145 and 150 volts since it bent the rattan. This must be done so that the tool can operate at these voltages with 100 lashes. Based on technical analysis, the electricity cost required for each, whipping process using an electric machine-based whipping tool is calculated based on the PLN, electricity tariff of Rp1,444.7 per kWh. With this calculation, the electricity cost per whipping is Rp224.43.

This cost includes the efficient power consumption of the tool and the operational time of each whipping cycle. In addition, the price of electric machine- based whipping equipment is estimated to be in the range of Rp3,500,000. This analysis shows that the use of electric machine-based tools is not only efficient in terms of implementation time but also economical in electricity consumption, so it can be adopted as a practical and sustainable solution for the implementation of the caning law in Aceh.

c. Discussion

The study "Design and Construction of an Electric-Based Whip for the Implementation of Jinayat Law in Aceh" employed an experimental approach to accomplish this goal. The steps in the research process include, in general, literature reviews, concept preparation, tool and material selection, tool testing, and repairs in the event that the design is flawed, followed by data collection, completion, and analysis to interpret the findings. The final steps involve drawing conclusions based on the analyzed data, discussing the implications of the results, and compiling the research into a comprehensive report or publication.

The design of an electric machine-based whipping tool uses simple electrical tools in the form of 2 contactors, an Omron timer, an autotrafo, a push button, 1 1-phase motor and rattan as a whip. The use of a 1-phase motor was chosen due to its ease of installation, affordability, and suitability for applications [16]. An electrical circuit is created in the

form of a physical circuit to be able to be run into an electric machine-based whipping tool once everything is sufficient. After all of the electric machine-based whipping tool's components have been installed and a schematic test has been completed, the tool is finally tested through product testing. The test consists of five tests with ten lashes and five voltages (V) strengths—100, 125, 135, 145, and 150 volts—that are deemed suitable for the force of the blows under Aceh's penal legislation.

The important point in these five tests is to know which one is suitable for use in the implementation of criminal law in Aceh. This study aims to determine the variation in voltage strength (V) on the whipping tool that is in accordance with the law of flogging in Aceh, which takes into account the physical condition of the individual being punished. Based on the research results, the tension strength (V) has been chosen as the main reference and the selection of this tension level (V) is based on the researcher's consideration to adjust the strength of the tool to the physical condition of the individual undergoing caning punishment.

This aligns with the principle of implementing punishment that upholds humanity and avoids excessive health risks. With the flexibility of tension strength (V), the punishment can be adjusted proportionally for both individuals with strong physiques and those who are more vulnerable, without reducing its effectiveness. These results provide a scientific basis in supporting the implementation of caning laws that are fair and in accordance with local norms. Furthermore, the use of a mechanically controlled system ensures consistency, minimizes the risk of excessive force [17].

The results of the electric machine-based whip test for the implementation of criminal law in Aceh have been tested in the Electrical Power Engineering laboratory of UIN Ar-Raniry Banda Aceh. The test was conducted by researchers and experts. From the results of the test, 10 trials were carried out with different voltage (V) levels. At a voltage of 100 Volts, the time required for 10 lashes was 10.00 seconds. Meanwhile, at the highest voltage of 150 Volts, the implementation time was drastically reduced to 4.38 seconds.

This test shows that the tool works faster and more efficiently at higher voltages. However, all tests resulted in a "Successful" status, indicating that the tool can function consistently at various voltage levels, this test also tested the criminal punishment in Aceh in the form of 3 khalwat punishments (10-30 lashes). The implementation time was reduced from 22.72 seconds at 100 Volts to 13.75 seconds at 150 Volts, and all tests were declared successful. For violations of khamar (40-60 lashes), the execution time decreased from 42.32 seconds at 100 Volts to 30.07 seconds at 150 Volts, also with successful results.

For violations of zina (100 lashes), the execution time decreased from 1 minute 22.56 seconds at 100 Volts to 1 minute 10.88 seconds at 150 Volts. However, at 145 Volts and 150 Volts, the tool required repairs causing the rattan to be bent which required repairs to the rattan so that this tool was able to work at 145 Volts and 150 Volts with 100 lashes. Overall testing of the electric-based whipping tool for the implementation of criminal law in Aceh is considered to have entered the feasibility of being used by the community and the Wilayatul Hisbah of Aceh province in the implementation of criminal law in Aceh.

The benefits of using an electric machine-based whipping device include the ability to vary the voltage or tension (V) level and better adapt to the physical state of the person serving the sentence. This helps maintain a balance between the implementation of punishment and the humanitarian aspect. This study supports the implementation of the caning law in Aceh by providing a measurable and consistent technology-based solution.

Conclusion

Based on the results of research that has been conducted on the design of an electric-based whip for the implementation of criminal law in Aceh, it can conclude that the design results of an electric machine-based whipping device using simple electrical tools in the form of 2 contactors, an omeron timer, an autotrafo, a push button, a 1-phase motor for the implementation of criminal law in Aceh [18]. This research has succeeded in developing an automatic whipping device with five voltage variations that can be adjusted to the physical condition of the individual undergoing the caning punishment.

The selection of this voltage variation aims to adjust the strength of the device to the physical condition of the individual, ensure the implementation of fair punishment and in accordance with the caning law in Aceh, and maintain the humanitarian aspect. The test results were conducted with 10 trials with different voltages (V) starting from at a voltage of 100 Volts, the time required for 10 lashes was 10.00 seconds, while at the highest voltage of 150 Volts, the execution time was drastically reduced to 4.38 seconds. This significant reduction in time indicates that higher voltage levels increase the speed of the whipping mechanism [19].

This test shows that the device works faster and more efficiently at higher voltages. The device's ability to operate consistently at different voltage levels was demonstrated by the "Successful" status of all tests, which also included a test of Aceh's jinayat punishment, which consists of three khalwat punishments (10–30 lashes). The execution time was shortened from 22.72 seconds at 100 volts to 13.75 seconds at 150 volts, and all tests were deemed successful. For khamar violations (40-60 lashes), the execution time decreased from 42.32 seconds at 100 Volts to 30.07 seconds at 150 Volts, also with successful results. In the case of adultery (100 lashes), the execution time was reduced from 1 minute 22.56 seconds at 100 Volts to 1 minute 10.88 seconds at 150 Volts.

However, at 145 Volts and 150 Volts, the rattan had to be repaired since the device needed to be fixed, bending it so that it could operate at 145 and 150 volts with 100 lashes. Overall testing of the electric-based whip for the implementation of criminal law in Aceh is considered to have entered the eligibility for use by the community and the province of Aceh in the implementation of criminal law in Aceh.

Although this journal contributes significantly to the documentation of the usage of electric machine-based flogging devices[20], there are still numerous issues that need to be fixed, according to suggestions for the research's advancement. It is hoped that more study may be done to enhance the device's design to satisfy operational and legal requirements. This could involve incorporating a more accurate voltage controller using a push button or adding pain sensors to guarantee that punishment is administered in a humane manner. With this improvement, it is hoped that the device can be widely accepted, not only

in Aceh Province but also in other countries that implement flogging laws, thus supporting more professional and standardized law enforcement.

References

[1] Z. Baharuddin Ar, Nurainiah, "Studi Fenomenologi Hukuman Cambuk Terhadap Prostitusi Online Di Kota Banda Aceh Dan Lhokseumawe," *Community Dev. J.*, vol. 5, no. 4, pp. 7052–7060, 2024.

[2] K. Nurussa'adah, "Penerapan Syariat Islam Di Nanggroe Aceh Darussalam (Nad) Dalam Sistem Hukum Nasional Indonesia," *Lex Mercat.*, vol. 1, no. 1, pp. 61–72, 2024.

[3] C. Fahmi, "Revitalisasi Penerapan Hukum Syariat di Aceh (Kajian terhadap UU No.11 Tahun 2006)," *Tsaqafah J. Perad. Islam*, vol. 8, no. 2, pp. 295–310, 2012.

[4] H. Y. Adan, "Syari'at Islam dan Qanun Jinayat di Aceh": Jurnal Hukum Pidana dan Politik Hukum," vol. 11, no. 1. 2022.

[5] H. A. L. Sadrina Sadrina, Akrimy Akrimy, "Analysis of Thinking Ability Among Higher Vocational School Students in Aceh," in *Proceedings Ar-Raniry International Conference on Psychology*, 2024, pp. 207–214.

[6] D. A. Wicaksono, "Pengaturan Hukum Cambuk Sebagai Bentuk Pidana Dalam Qanun Jinayat," in *Majalah Hukum Nasional*, 2018.

[7] N. Fadlullah, "Positivisasi Hukum Islam dan Persinggungannya dengan Kelompok Etnonasionalis di Aceh," *Asy-Syir'ah J. Ilmu Syari'ah dan Huk.*, vol. 54, no. 1, pp. 1–26, 2020.

[8] A. G. Berutu, "Penerapan Syariat Islam Aceh Dalam Lintas Sejarah," *Istibath J. Huk.*, vol. 13, no. 2, pp. 163–187, 2016.

[9] A. A. Tumbol, "Kajian Yuridis Terhadap Pidana Cambuk Di Provinsi Nanggroe Aceh Darussalam Dalam Perspektif Hak Asasi Manusia," *Lex Crim.*, vol. 10, no. 9, 2021.

[10] U. Jumyadi, "Tradisi Ujungan dalam Perspektif Antropologi: Ritual Saling Cambuk sebagai Ekspresi Budaya dan Simbol Ketangguhan Masyarakat Adat," *KALA MANCA J. Pendidik. Sej.*, vol. 13, no. 1, pp. 2303–2189, 2024.

[11] T. R. Z. Dedi Arisandi Ritonga, Syaiful Asmi Hasibuan, "Sanksi Hukum Fasilitator Judi Dadu dalam Analisis Hukum Pidana Islam dan Hukum Positif (Studi Kasus di Kecamatan Dolok Kabupaten Padang Lawas Utara)," *J. Ilm. Ilmu Pendidik.*, vol. 7, no. 2, pp. 1587–1597, 2024.

[12] R. S. Livia Maylisandi Livia, Arif Fadilah, "Pengaturan Hukuman Cambuk Dalam Hukum Pidana Islam," *J. ISNU Sahabat*, vol. 1, no. 3, pp. 198–205, 2024.

[13] D. S. I. Aceh, "Qanun Aceh Nomor 6 Tahun 2014 tentang Hukum Jinayat." 2014.

[14] M. Rismanto, M. A. Choiron, and S. Sugiono, "Optimasi Parameter Desain Multi-Cell Hexagonal Crash Box terhadap Absorbsi Energy Impact dengan Metode Taguchi," *J. Rekayasa Mesin*, vol. 11, no. 3, pp. 427–440, 2020.

[15] T. T. M Ikhsan, Z Zufrizal, "Power Deficit Analysis of Multiple Hydrokinetic Power Plants in an Open-Channel System," *Circuit J. Ilm. Pendidik. Tek. Elektro*, vol. 8, no. 2, pp. 166–177, 2024.

[16] I. F. Ridwan Ridwan, Muhammad Rizal Fachri, "Development of Home Security System Using Motion Sensor and Magnetic Sensor with ESP-32 Cam Based on Telegram," in *Proceedings International Conference: Education, Science, and Technology*, 2024, pp. 345–373.

[17] M. I. MR Fachri, "Prototipe Sistem Keamanan Rumah Pintar dengan Sensor Ultrasonik menggunakan Kamera Smartphone dan Arduino," *J. Ris. Tek. Fis.*, vol. 1, no. 1, pp. 7–15, 2025.

[18] A. N. Hari Anna Lastya, Yuwaldi Away, Ira Devi Sara, "ANFIS Parallelization Control on Triple-Axis Sun Tracker to Minimize Solar Rays Incidence Angle on Photovoltaic," *IEEE Access*, 2025.
[19] M. M. Ahmad Khudzari, Hari Anna Lastya, "Analisa Kelayakan Instalasi Listrik Bangunan Yang Berusia Diatas 15 Tahun Di Kabupaten Aceh Besar," *JUPITER (Jurnal Pendidik. Tek. Elektro)*, vol. 9, no. 1, pp. 42–47, 2024.
[20] M. I. Abdul Hanif, Hari Anna Lastya, "Control And Monitoring System Design Of Internet-Based Electrical Installations," in *Proceeding on Computer and Electrical Education Research (PROCESSOR)*, 2023, pp. 34–47.