

Stun Gun

Decision Making Strategies

Concept 1: Stun Gun Transformer

- Decision Matrix

		Flyback Transformer	Forward Transformer (LM5015MHE)	Boost Converter (VXO78012)
Output Voltage Range	5	5	2	1
Current Range	5	4	1	2
Size	2	3	4	2
Price	3	5	3	4
Operating Temperature	2	5	3	5
Score		76	38	39

- Analytical Hierarchy Process

		Flyback Transformer	Forward Transformer (LM5015MHE)	Boost Converter (VXO78012)
Output Voltage Range	0.45	0.12	0.29	0.59
Current Range	0.40	0.26	0.43	0.32
Size	0.09	0.53	0.26	0.21
Price	0.03	0.45	0.2	0.4
Operating Temperature	0.03	0.31	0.38	0.31
Score		0.23	0.34	0.43

For the transformer, the Decision Matrix vs the AHP values do not match. The calculations for the AHP were based on stars given to some of the categories that could not be quantified and the

weights for those specific categories could be the root cause of the differences we see in the tables. For our needs and requirements for the practicum project, we will be choosing the Flyback transformer.

Concept 2: Position Sensor for Stun Activation

- Decision Matrix

		Magnetic Door Sensor (Normally Open Closed NC/NO)	Ultrasonic Sensor (HC-SR04)	Motion Sensor (HC-SR501)
Detection	3	5	4	3
Price	3	2	2	5
Operating voltage	4	3	5	3
Trigger range	2	5	4	3
Delay time	4	5	3	1
Score		63	58	46

- Analytical Hierarchy Process

		Magnetic Door Sensor (NC/NO)	Ultrasonic Sensor (HC-SR04)	Motion Sensor (HC-SR501)
Detection	0.36	0.42	0.33	0.25
Price	0.36	0.26	0.26	0.48
Operating voltage	0.15	0.38	0.42	0.20
Trigger range	0.1	0.40	0.32	0.28
Delay time	0.04	0.11	0.81	0.08
Score		0.35	0.34	0.32

The decision matrix and the AHP both point towards the Magnetic Door Sensor. Again some of the categories were given stars to quantify as the actual values were not comparable between the alternatives. The final decision is also based on the overall structure and marketing aspect of our project. Thus we will be going with the Magnetic Door Sensor. Linked Sheets file for all calculations available upon request.