

Sine Wave in ITF Taekwon-Do

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Sine wave is a term used to describe the stylistic movements of martial artists who practice the Chang Hon style of Taekwon-Do. The name arose due to the fact that when performed correctly, the performer's centre of mass describes a sine wave shape when the performance of a fundamental movement is viewed side on. The concept was introduced by General Choi Hong Hi in the 1970s and further refined in the 1980s, and is unique to his Chang Hon style of Taekwon-Do.

The sine wave movement occurs naturally as seen in the vertical oscillations of the body during human walking and running. General Choi applied the concept to Taekwon-Do because in addition to elements of his Theory of Power, he understood it as a means to increase the effectiveness of Taekwon-Do techniques.

Picture a practitioner transitioning from a parallel ready stance into a right walking stance front punch with the right fist. To understand how the normal sine wave works, as the performer moves horizontally, at the same time the centre of mass at the hips follows a down up down motion in the vertical plane.

Sine wave



Image courtesy www.tkdimpact.co.uk, sourced 21/12 15

The first downward part has the body dropping slightly by flexing the left knee and hip. The body is relaxed including both arms which are slightly bent at the elbows and not doing anything specifically. In the second part the left knee and hip extend a little without becoming fully extended. The effect of this is to raise the centre of mass, but this is done at the same time as the centre starts to move forward into the next walking stance. At this stage the arms are preparing for the punch but still relaxed and bent at the elbows. The right arm moves through a small forward and backward motion in the vicinity of the waist to prepare for the punch, while the left is preparing to be pulled back. In the final part of the motion, there is a simultaneous retraction of the pulling hand to the waist and fast extension of the right elbow that fires the punch out. This is achieved while the performer drops down and moves forward into the next

stance. In the final part all the muscles of the body are tensed for a fraction of a second at the same time as the punch is delivered.

How does the sine wave motion add to the normal force of the punch? That trick is achieved by the simple addition of the weight of the performer behind the force of the punch itself. In the second part of the sine wave the performer's centre of mass moves to its highest position in the cycle. In the third and final part the performer then rapidly steps down and forward into the new stance. This decrease in height allows the force of gravity to act on the mass of the performer, thus adding weight behind the force of the punch.

The down up down motion is the most common type of movement in Chang Hon patterns. When the three parts are performed together over a time interval of about one second it is called normal motion. All the movements of Chon-Ji Tul for example are performed with normal motion.

In contrast slow motion movements are present in some patterns to challenge the performer's control and balance. Slow motion movements also utilise a full sine wave with one breath. An example of this is in Moon-Moo Tul with the bending ready stance A, high side piercing kick and high reverse turning kick of movements one, two and five.

Sometimes in a given self-defence situation there may not be enough time for the practitioner to perform movements with a normal sine wave. The attacker may be moving too fast or there may be multiple attackers. In this context the sine wave is modified to allow for fast motion. Fast motion is defined as when two consecutive movements are performed with two sine waves and two breaths. This motion is illustrated in Yul-Gok Tul with the two walking stance middle punches in movements nine, 10, 13 and 14. After the low front snap kick of movements eight and 12, there is a normal sine wave for the first middle punch of nine and 13, where the centre of mass goes down up down. However, because the second punch of movements 10 and 14 is performed faster, instead of initiating a down movement the centre of mass is immediately raised again and then dropped down to complete the punch. Two punches performed with two normal sine wave motions would be comprised of six parts. There would be a down-up-down-down-up-down. In fast motion the parts are down-up-down-up-down. In other words the second punch is speeded up because one third of a sine wave is saved. The overall effect of fast motion is to deliver a quicker than normal second punch but still with the full weight of the body behind the force of the punch.

Continuous motion is a further modification to the normal plan, where two consecutive movements are performed with two sine waves but one breath. This is illustrated in Ge-Baek Tul, with the forearm rising blocks and forearm low blocks of movements five, six, 29 and 30.

The final modification of normal motion is connecting motion, where two movements are performed with one sine wave and one breath. Ge-Baek Tul features a scooping block and middle punch in movements nine, 10, 29 and 30. The application of the sine wave in the scooping block is unusual because the down part allows the performer's hand to connect to the attacker's foot for example, while the up part provides the force for the scooping aspect of the block. The final down part is timed to the delivery of the punch.

The sine wave is a clever application of a physical principle to help practitioners of General Choi's Chang Hon style of Taekwon-Do deliver the maximum amount of force from a given movement to a target. All things being equal a person of relatively small body mass can utilise their body weight to deliver a blow with the potential to defeat a much larger opponent.

References

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http://taekwondo.wikia.com/wiki/Taekwondo_Sine_Wave