THEORY OF POWER
(Him Ui Wolli)

1. REACTION FORCE (Bandong Ryok) Every force has an equal and opposite force. A punch with the right fist is aided by pulling back the left fist to the hip.

2. CONCENTRATION (Jip Joong) By applying the impact force onto the smallest target area, it will concentrate the force and therefore increase its effect. The utmost concentration is required in order to mobilize every muscle of the body onto the smallest target area simultaneously.

Concentration is done in two ways: 1) Concentrate every muscle of the body, particularly around the hip and abdomen, toward the appropriate tool to be used at the proper time 2) To concentrate such mobilized muscles onto the opponent's vital spot.

3. EQUILIBRIUM (Kyun Hyung) is classified in both dynamic and static stability. They are closely inter-related. The maximum force can only be produced when the static stability is maintained through dynamic stability. Good equilibrium, the center of gravity of the stance must fall on a straight line midway between both legs when body weight is equal on both legs, or center of the foot , if necessary, to concentrate the bulk of body weight on one foot. Center of gravity can be adjusted according to body weight. Flexibility and knee springs are important in maintaining balance for both a quick attack and instant recovery. The heel of the rear foot should never be off the ground at the point of impact.

4. BREATH CONTROL (Hohup Jojul) Breath stopped in the state of exhaling at the critical moment when a blow is landed against a pressure point on the body can prevent a loss of consciousness and stifle pain. A sharp exhaling of breath at the moment of impact and stopping the breath during the execution of a movement tense the abdomen to concentrate maximum effort on the delivery of the motion.

5. MASS (Zi Lyang) The maximum energy or force is obtained from maximum body weight and speed and it is all important that the body weight be increased during the execution of a blow. No doubt that maximum body weight is applied with the motion by turning the hip. The large abdominal muscles are twisted to provide additional body momentum. The hip rotates in the same direction as the attacking or blocking tool. Another way of increasing body weight is the utilization of a springing action of the knee joint. This is done by slightly raising the hip at the beginning of the motion and lowering it at the moment of impact to drop the body weight into motion.

6. SPEED (Sokdo) is the most essential factor of force or power. Force = Mass x acceleration (F=MA) or Power = Mass x Velocity2 (P=MV2). According to kinetic energy, every object increases it's weight as well as speed in a downward movement. For this reason at moment of impact, the position of the hand normally becomes lower than the shoulder and the foot is lower than the hip while the body is in the air. Reaction force, breath control, equilibrium, concentration and relaxation of the muscles cannot be ignored. These are factors that contribute to speed and all these factors together with flexibility and rhythmic movements must be well coordinated to produce the maximum power in Taekwon-Do.

7. SPEED AND REFLEX (Sokdo wa Banung) Normal reflex time is the elapsed time of reflex action. Normal reflex time has been experimentally determined to be around 2/10 of a second, at the quickest. The following formula will enable the student to further

understand the significance of speed in the execution of Taekwon-D0 techniques. The formula we use to calculate the power of any technique is:

$$P=1/2\ MV2$$

P stands for power
1/2 is a constant
M stands for mass
V stands for velocity or speed

This equation reveals why developing speed is the most important factor in developing power. For example, if the mass is increased by a factor of three (with the speed kept constant) then the power is also increased by the factor of three (with the mass kept constant) then the power is increased by a factor of nine.

$$\text{POWER} = (1/2) \times (\text{mass}) \times (\text{velocity})2$$
$$= (1/2) \times (\text{mass}) \times (\text{velocity}) \times (\text{velocity})$$
$$\text{VELOCITY} = (\text{distance of last interval}) \times (1/\text{execution time of last interval})$$