

2. IN MAKING UP THE STANDARD PHYSICAL FITNESS TEST OF JUDOISTS

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Association for the Scientific Studies on Judo, Kodokan has given a physical fitness test to judoists since 1961. And it was decided at this time to make the standard physical fitness test based on the experience. In making the standard physical fitness test, methods widely used before still remain and at the same time were added these subjects showing the characteristics of judoists. A conference was held several times by a training sub-committee for making this test, and the conclusion in outline was reached. So we decided on making a measurement guide. It is desirable that the physical fitness test of judoists will be given from now on by this method. Thus the better results of measurement will be given and moreover, the excellent material for knowing the changes of judoists' physical fitness from now on be given.

The method of Standard Physical Fitness Test for Judoists.

(I) Aims of the Standard Physical Fitness Test

Aims of this test are that judoists will be deeply interested in their own physical fitness by making sure their present condition of physical fitness and knowing its merit and demerit, and that they will make this test a guide to a training for all-round physical fitness and for improving a special technique.

(II) An Object of Standard Physical Fitness Test

People above junior high school who play judo are considered to be an subject.

(III) Content and Method of Standard Physical Fitness Test

This test consists of 15 anthropometric measurements and 13 functional ones, which amount to 28 in all.

If instruments are not equipped enough, it may be omitted in the case of A (15) photograph for body type B (2) reaction time and (6) pull strength.

I. Measurement Items

A. Anthropometric Measurement

(1) body weight (2) height (3) length of upper limb (right and left) (4) length of lower limb (right and left) (5) girth of neck (6) girth of chest (7) girth of waist (8) girth of hip (9) girth of upper arm (right and left) (10) girth of forearm (right and left) (11) girth of wrist (right and left) (12) girth of thigh (right and left) (13) girth of calf (right and left) (14) subcutaneous fat (15) photograph for body type

B. Functional Items

(1) side step }
 (2) reaction time } agility test

- (3) vertical jump—power test
- (4) grip strength (right and left) } muscular strength test
- (5) back strength } muscular strength test
- (6) pull strength
- (7) push up } muscular endurance test
- (8) sit up } muscular endurance test
- (9) vital capacity } the whole body endurance test
- (10) Harvard step test } the whole body endurance test
- (11) standing trunk flexion
- (12) flexibility of ankle joint (right and left) } flexibility test
- (13) twist of upper body (right and left) } flexibility test

II. Methodology for the Measurement

A. Anthropometric Measurement

(1) body weight

preparation a scale

method An examinee stands quietly on a scale only with his shorts, and his upper body naked.

record It is read by the unit of 0.1 kg. (for example 75.8 kg.)

suggestions in measurement

- (a) An examinee should not eat or drink about one hour before measurement.
- (b) It is desirable to urinate before measurement.
- (c) Full inspection should be made as a scale becomes easily out of order.

(2) height

preparation a height meter

method An examinee loses his strength of shoulder and takes an upright position and stands with part from his heels to hips lightly touching a height meter. His head faces front and a straight line combining an ear-lap with an eyehole is horizontal. The length from the floor to his top of the head is measured.

record It is read by the unit of 0.1 cm. (for example 174.6 cm)

suggestions in measurement

- (a) Posture should be kept right.
- (b) A height meter should be set up right vertically on the floor.

(3) length of upper limb

preparation Martin's anthropometric apparatus.

method A straight-line distance between acromion and a finger tip is measured. Acromion is a bone at the turning from a shoulder to an arm when an examiner's finger tip lightly touches a shoulder of an examinee, and a finger tip is that of the middle finger. In an upright position, an upper limb is rightly stretched and lowered, and both right and left are measured.

record It is read by the unit of 0.1 cm. (for example 71.8 cm.)

suggestions in measurement

- (a) Right position of acromion should be found. It is advisable to touch scapula by turning a hand to the back and then proceed to a shoulder point.
- (b) Many judoists elbows are curved, so joint of an elbow should be fully stretched.

(4) length of lower limb (spina iliaca anterior superior)

preparation Martin's height meter

method There are several methods, but here height from the floor to an iliospinale is measured.

This is the point where the projection tip is protruded most downward when a thumb pushes a spina iliaca anterior superior from downward to upward. Both right and left are measured.

record It is read by the unit of 0.1 cm. (for example 90.8 cm.)

suggestions in measurement

- (a) Knees are apt to be bent, so they should be stretched fully enough.
- (b) Generally the position of iliospinale is often taken too high, so it is important for an examiner to make sure of it by touching.

(5) girth of neck

preparation A tape-line is used in all the following perimeters.

method a perimeter measured by turning a tape-line perpendicular to a neck beneath larynx.

record All the following perimeters are read and recorded by the unit of 0.1 cm. (for example 34.5 cm.)

suggestions in measurement A tape-line should be turned perpendicular to a long axis of a neck.

Preparation and record concerning with the following perimeters are all the same, so they are not inserted here.

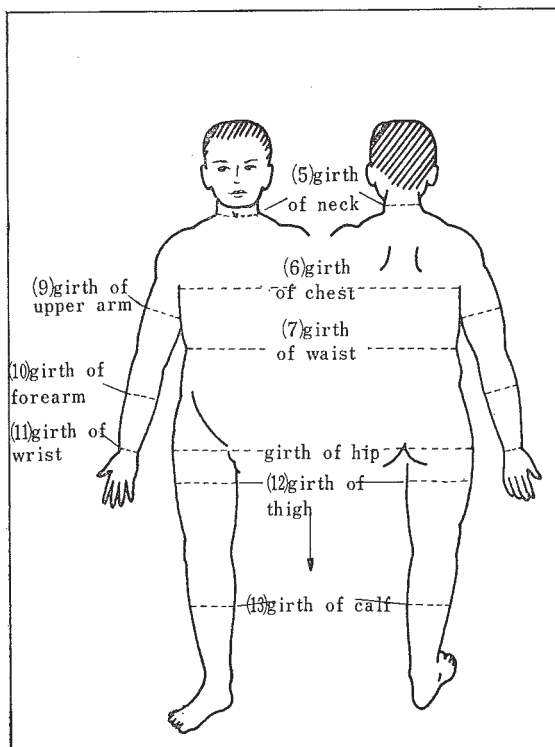
(6) girth of chest

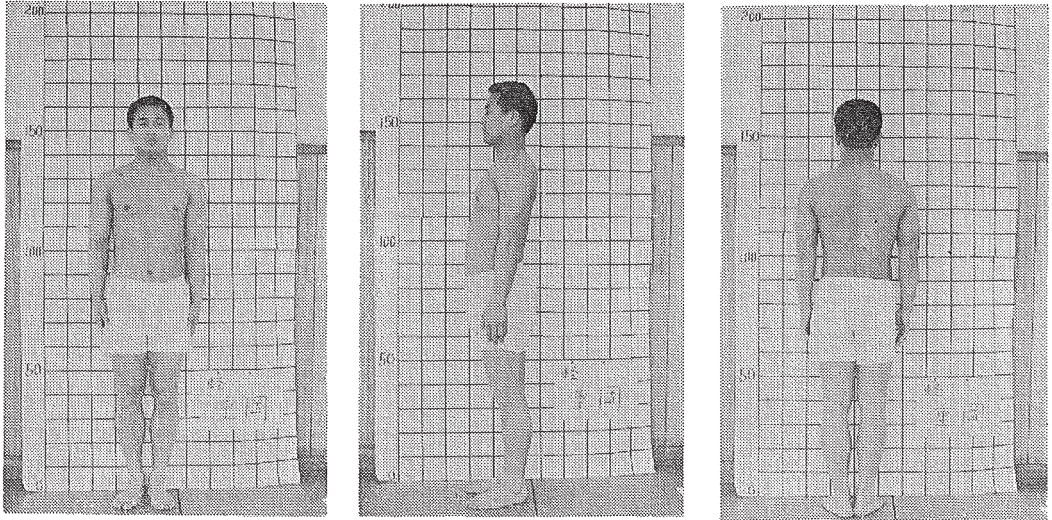
method Measurement is taken by winding a tape-line just under a lower corner of scapula, and right above the armpit hollow and the nipple. The value in resting condition when expiration is over, is taken. When a tape-line is placed on a body, an examinee may keep his both arms a little apart from his body, but he lowers his arms light naturally on both sides when measurement is taken.

suggestions in measurement It sometimes happens that measurement is taken with a tape-line lowered, as the point on the back cannot be seen. An examiner should make sure without fail if a tape-line passes right on a lower edge of scapula or not. It is better in this case to have an assistant.

(7) girth of waist

method This means the minimum girth of abdomen, namely a tape-line is wound around the place where right and left side-abdomen walls are most sunk between costal bow and iliac edge.





Photograph for Body Type

suggestions in measurement Abdomen wall moves by respiration, so the value when expiration is over is taken as is the case of girth of chest.

(8) girth of hip

method An examinee is made to stand straight arranging both legs and his maximum girth of regio glutea is measured by placing a tape-line horizontally around regio glutea.

(9) girth of upper arm

method With arms hanging measurement is taken by winding a tape-line around the biggest part of upper arm and perpendicular to the axis of upper arm. Both right and left are measured.

suggestions in measurement An examinee should neither throw his strength into his arms nor bend them, but hang them naturally.

(10) girth of forearm

method With arms hanging, measurement is taken by winding a tape-line around the biggest part of forearm and perpendicular to the axis of forearm. Both right and left are measured.

suggestions in measurement When measurement is taken an examinee should not fist but unhold his palms lightly.

(11) girth of wrist

method Measurement is taken by winding a tape-line, which is perpendicular to the axis of forearm, around arm-joint of forearm hanging down.

suggestions in measurement An examiner should measure the joint of wrist.

(12) girth of thigh

method An examinee is made to stand with heels of both legs 5—10 centimeters apart. And measurement is taken horizontally around the inwardly most swelled part just under regio glutea. Both right and left are measured.

(13) girth of leg

method Legs are kept apart in the same way as measurement of girth of thigh, and measurement is taken horizontally around the most swelled part of gastrocnemius of leg. Both right and left are measured.

suggestions in measurement An examiner should be careful not to loose a tape-line.

(14) subcutaneous fat

preparation Skinfold caliper

method An examinee takes a standing position and his skin is pinched up by making wrinkles parallel to the axis of body by left thumb and the rest four fingers. And measurement is taken one centimeter from the thumb.

record It is read and recorded by the unit of 1 mm. (for example, 5 mm. 24 mm.)

suggestion in measurement

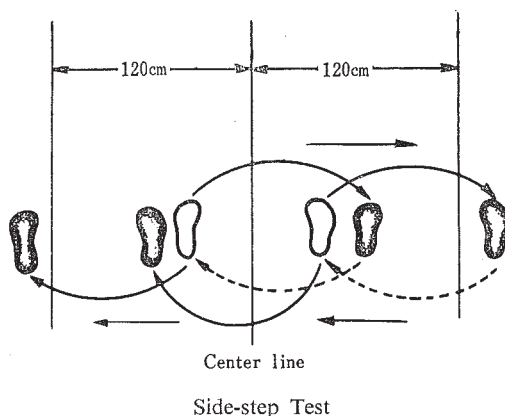
- (a) If skinfold is too thick to pinch, measurement is taken several times and its average value is taken. Measurement should be taken twice even if skinfold is thin.
 - (b) Numeral value is not divided by two, but recorded just as it is.
- (15) photograph for body type

preparation a camera, a tripod, a 35 mm. film. In a vellum paper, 200 cm. long and 150cm. wide, are drawn lines every 10 cm. and this paper is placed on a wall.

method In an illustrated method (examples), a picture is taken from three directions—front, side and back. An examinee takes an upright position with his tiptoes about 5 cm. apart, his heels joined and without throwing strength into his shoulder. A camera is placed about the height of half the stature, letting in a paper in the back fully enough.

suggestions in measurement

- (a) A mark showing a name, body weight or classes should be written under the right of a picture. It is advisable moreover to put the measurement date.
- (b) Heels should be firmly joined.

**B. Functional Measurement**

In the case of the same subjects as those in sports test by Ministry of Education, the method is also the same.

(1) side-step

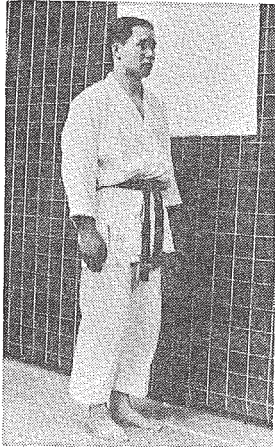
preparation A center line is drawn on the floor as the illustration and two parallel lines are drawn 120 cm. from both sides of it. A stop-watch.

method An examinee stands striding over a center line and side-steps (not jump) over or touching a right line with the signal of beginning. Next he returns to the center line and again side-steps over or touching a left line.

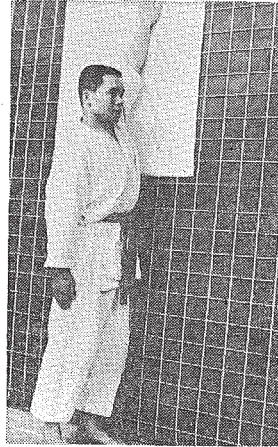
record The exercise mentioned above is repeated for 20 seconds and one point is added every time he passes over each line (right, center, left and center lines make 4 points). This test is given twice and the better of the two marks is recorded. A stop-watch is used for measuring time.

suggestions in measurement

- (a) Choose non-slippery places, either indoors or outdoors.



Picture 1
Vertical Jump



Picture 2
Vertical Jump

- (b) This test is not given continuously to the same examinee.
 (c) No point is added in the following.
 (1) An examinee does not touch nor step over an outline.
 (2) An examinee does not stride over a center line.
 (2) reaction time (simple reaction time to light stimulus)

preparation a set of equipment for measuring reaction time

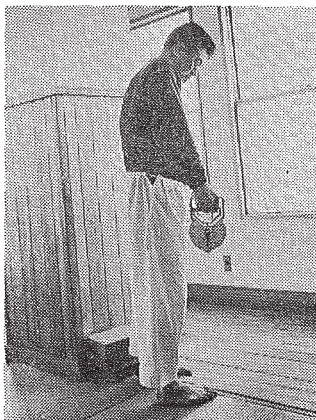
method An examinee sits on a chair one meter in front of a lamp placed at the height of his eyes and places his index finger on a key at hand and gets ready to push it. The moment a lamp is lighted he pushes the key.

record After practicing twice in a method above, measurement is taken five times. The longest and the shortest records are excluded and the average of the rest three is calculated. It is recorded by the unit of 1/1000 second. (for example, 186m sec)

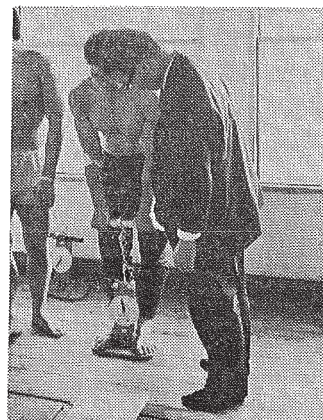
suggestions in measurement

- (a) If possible, a dark and quiet room should be chosen for measurement.
 (b) A suitable time space (a few seconds) should be taken for measurement.
 (3) vertical jump

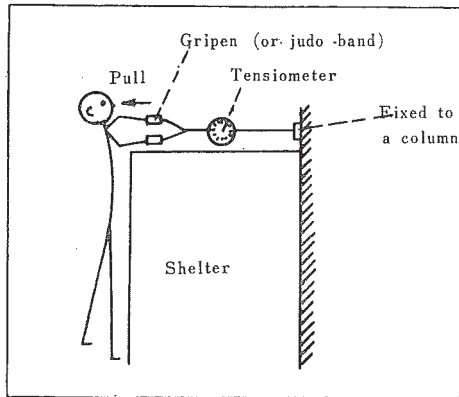
preparation measurement paper (1.5 m. long, 0.5 m. wide) or a blackboard and an eraser color chalks, a bar-scale or a tape-line. 20 centimeters from a wall, is drawn a straight line parallel to the wall.



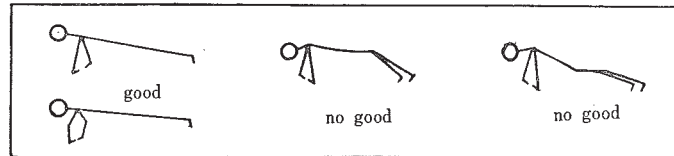
Grip Strength



Back Strength



pulling strength



Push-up Position

method

- (a) Chalk powder is put on a finger tip on the side of wall. And an examinee stands arranging both legs, circumscribing the line illustrated in the first picture (picture 1).
- (b) At the place an examinee jumps as high as possible and marks on measurement paper (a blackboard) with his finger tip.
- (c) Measurement is taken twice, and an examinee stands under the higher mark, with one leg touching the wall and the other circumscribing the line and stretches out his one hand as high as possible and marks with his finger tip. Heels should not be raised on this occasion.

record Vertical distance between a jumping mark and a standing one is measured. It is recorded by the unit of a centimeter and we count fractions of . 5 and over as a whole number and disregard the rest in the case of less than a centimeter.

suggestions in measurement

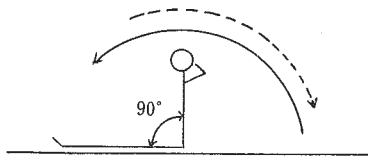
- (a) In the second picture, an examinee stands right under the mark made by jumping and stretches out his hand straight upwards.

(4) grip strength

preparation Smedley-type grip-dynamometer

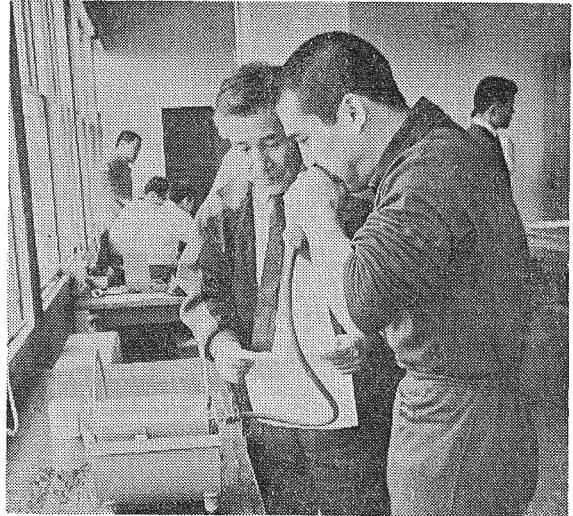
method

- (a) An examinee grips in an illustrated way, turning an indicator of a grip-dynamometer outward. On this occasion, grip width is regulated so that the second joint of an index finger may become almost perpendicular.
- (b) An examinee takes an upright position with both legs naturally apart on both sides and hanging his arms in a natural way and grips as strongly as possible, being careful that a grip-dynamometer should not touch his body or cloth. On this occasion, an examinee should be careful not to wave about a grip-dynamometer.



Sit-up test

Vital Capacity



record An examiner reads the record of a meter. Measurement is taken twice on both right and left hands by turns and the better mark of each hand is recorded. The unit of measurement value is a kilogram. And in the case of less than a kilogram, fractions of .5 and over are counted as a whole number and the rest disregarded.

suggestions in measurement

- (a) Measurement order is from right to left.
- (b) This test is not given continuously to the same examinee.

(5) back strength

preparation a back-strength meter

method

- (a) An examinee stands on a stand of a back-strength meter with both legs 15 cm. apart and grips the handle of a back-strength meter by his useful hand, with his knees stretched. Next the examinee stretches out his back and inclines his upper body 30 degrees forward.
- (b) An examinee pulls the handle, which is gripped firmly with both hands, as strongly as possible by gradually increasing his pulling strength. On this occasion his knees should not be bent and his upper body is set up.

record An examiner reads the record of a back-strength meter. Measurement is taken twice and the better mark of the two is taken. It is recorded by the unit of a kilogram, and in the case of less than a kilogram, fractions of .5 and over are counted as a whole number and the rest disregarded.

suggestions in measurement

- (a) This test is not given continuously to the same examinee.
- (b) A handle should not be pulled backwards.

(6) pull strength

preparation a tensiometer (or a grip-dynamometer)

method

- (a) On a shelter at the height of chest is placed a tensiometer, as illustrated, with one end fixed to a column and with a griper or a judo-belt attached to the other.
- (b) This test is not given continuously to the same examinee. The height of a fixed end is regulated so that his shoulder, hands and fixed end may be the same height.
- (c) An examinee grips it turning his palms downward. On this occasion the length of a griper

is regulated so that joints of both elbows may be perpendicular.

(d) Supported by a shelter, an examinee pulls with both hands just like the pulling of judo.
record An examiner reads the record of tensiometer. Measurement is taken twice, and the better one is taken. The unit is a kilogram. (for example 74 kg.)

Measurement is not taken continuously.

suggestions in measurement

(a) An examinee's body closely touches a shelter in advance and the length of a griper or a judo band is suitably regulated.

(7) push up

preparation a stop-watch

method

(a) An examinee takes a push-up position with his arms vertical to the floor and bends his arms fully enough until his body becomes horizontal, and then stretches them out.

(b) An examinee does this once a second in time with an examiner's order.

record

(a) An examinee does this as many times as possible. If he cannot do this successively three times in time with the order, the frequency of flexion before then is counted.

(b) When an examinee does this more than 100 times in the prescribed way, this test is stopped. And it is recorded as 'over 100'

suggestions in measurement Attention should be paid especially to a posture so that the back, waist and lower limb may fully be stretched. Measurement is taken once.

(8) sit up

preparation a stop-watch

method

(a) An examinee lies on the floor on his back, with his hands crossed behind his head and his heels 45 cm. apart. A supporter holds down an examinee's ankle.

(b) An examinee sits up with a sign of beginning and bends himself to a position in which his waist makes acuter angle than 90 degrees.

(c) He lies again on his back with his hands still crossed behind his head and stretches himself until his scapula touches the floor.

(d) An examiner orders once per two seconds and an examinee sits up in time with the order.

record

(a) When an examinee cannot do this successively three times in time with the order, or detaches his hands crossed behind his head, it is considered as a failure and the frequency until then is recorded.

(b) When an examinee does this over 150 times in the prescribed method, it is stopped. And it is recorded as 'over 150'

suggestions in measurement

(a) One motion has a calling of 'one, two, three' and in one, two, an examinee sits up and in three, he lies on his back.

(b) Measurement is taken only ones.

(c) Attention should be paid to the position of sitting and lying on the back.

(9) vital capacity

preparation a spirometer, alcohol cotton, a thermometer

method An examinee stands with his feet apart, and with a drawing opening of a spirometer in his hands and breathes in air as much as possible and out as much as possible through the drawing opening.

record

(a) Measurement is taken twice and the bigger value is taken.

- (b) It is recorded by the unit of 20 cc. (for example, 4860 cc.).

suggestions in measurement

- (a) An examiner should regulate the graduation for temperature correction without fail.
 (b) The record is read after some time until the expiration temperature and water temperature become balanced.
 (c) Measurement of the same examinee is not taken continuously.
- (10) Harvard step test

preparation a 50.8 cm. high stand, a stop-watch

method

- (a) In an illustrated way, an examinee steps up and down a stand for five minutes at the rate of 30 times a minute. An examiner gives an order of one, two, three and four, and orders 'one' per two seconds. An examinee raises one leg with the order of one (picture b) from the first position (picture a) and stands straight on a stand, stretching his knees with the order of two (picture c) and brings down his left leg raised first with the order of three (picture d) and takes the first position with the order of four. It is better to begin stepping up by the same leg every time. But if an examinee is tired he may change his stepping-up leg on the way.

- (b) An examinee may begin by either leg if the rules prescribed above are observed.

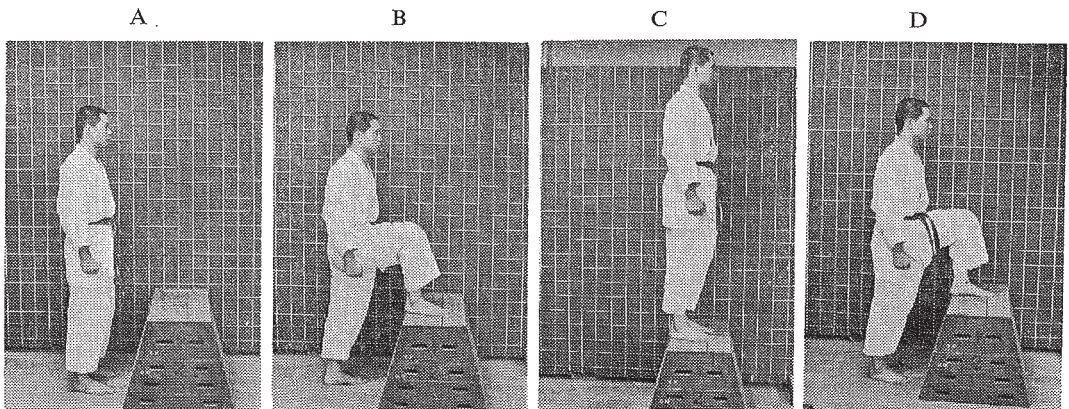
record After a five-minute up and down exercise an examinee is made to sit on a chair, and measurement of pulse is taken three times—from one minute to one minute and half, from two minutes to two minutes and half, and from three minutes to three minutes and half after exercise. Besides, if an examinee becomes unable to continue it on the way, or an up and down exercise becomes more than three times later, the exercise is stopped and immediately the time is recorded by the unit of a second and measurement of pulse after the exercise is taken in the same way as mentioned before.

A judgment index is sought for by the next formula and in the case of two places of decimals, fractions of .5 and over are counted as a whole number and the rest disregarded.

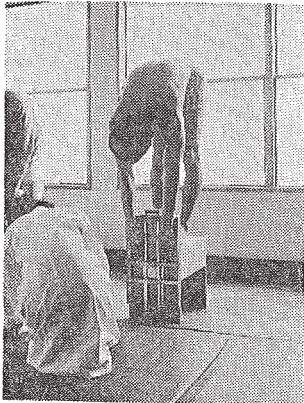
$$\text{a judgment index} = \frac{\text{continuance time (seconds) of an up and down exercise of a stand} \times 100}{2 \times (\text{the total of three times measurement pulse})}$$

suggestions in measurement

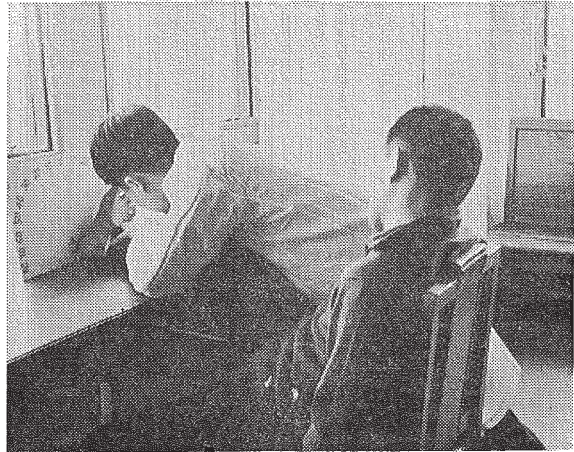
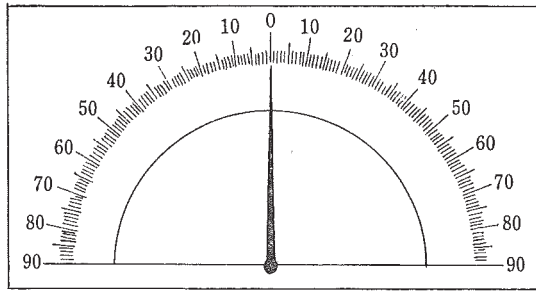
- (a) Pulse is measured as a rule at a wrist. If the pulse at a wrist is difficult to be measured, heart pulse or carotid pulse may be measured.
 (b) An examinee should not count his own pulse.
 (c) A metronome may be used.



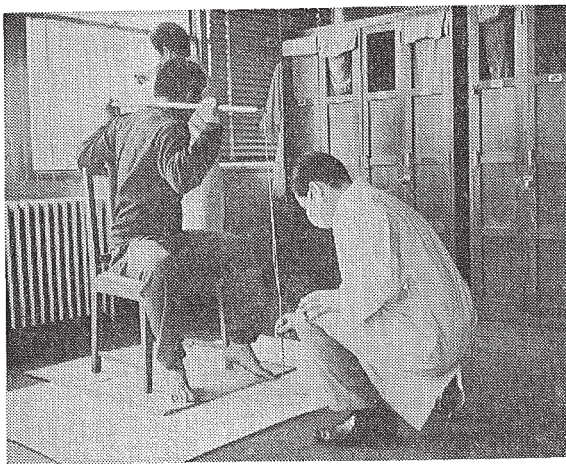
Step-order of Harvard Step Test



Standing Trunk Flexion



Flexibility of Ankle Joint



Twist of Upper Body

(d) This test is given once.

(11) standing trunk flexion

preparation a stand with a rule whose graduation is 25 cm. upward and 40 cm. downward from the floor as 0 as illustrated in a picture.

method

- (a) An examinee stands on a stand arranging both legs and joining his heels, with his with tiptoes 5 cm. apart.
- (b) An upper body is gradually bent forward, touching a rule with both hands arranged and

with finger tips stretched. On this occasion knees should not be bent.

record The lowest point of a finger tip is read by the graduation of a rule. If it does not reach to 0 point, the distance is recorded as minus. Measurement is taken twice and the better one is recorded. The unit is a millimeter and in the case of less than a millimeter, fractions of .5 and over are counted as a whole number and the rest disregarded. (for example 18.7 cm. 5.8 cm.)

suggestions in measurement

- (a) Reaction should not be given.
- (b) A head is placed between arms.

(12) flexibility of ankle joint (adduction and abduction)

preparation a paper semicircle graduator whose radius is 25 cm. as illustrated.

method An examinee takes a long-stay posture, placing on A his tips of heels on the side of the big toe, and insides of his feet are joined on zero line.

An examiner holds down an examinee's ankles, and in this posture an examinee rolls his leg outward as much as possible and next rolls it inward as much as possible. And an examiner measures the angles of the largest abduction and the largest adduction.

record Angle is read by making the largest abduction angle and the largest adduction one of each leg 1 degree.

Measurement is taken twice and the better one is recorded.

suggestion in measurement Heels are often movable, so an original point A of a graduator should be regulated every time.

(13) twist of upper body

preparation

- (a) A paper circle graduator whose radius is one centimeter
- (b) A 1.2 m. stick is prepared. On its both ends is hung a cord (about 90 cm.) with a weight and at the end of the cord is placed something like a nail so that it may be easier to read graduation.

method

- (a) An examinee sits on a chair at the center of a graduator.
- (b) An examinee has a stick parallel to his shoulder line and the stick is set at zero on a graduator.
- (c) The fixed upper body is quietly rolled horizontally right and left. (refer to a picture).

record

- (a) The maximum twist angles of right and left are read separately on a graduator and recorded. A clock rotation is considered as right and its reverse one as left (direction pulling left shoulder).
- (b) Measurement unit is a degree. This test is given twice and the better one is recorded.

suggestions in measurement

- (a) This test should start with a shoulder line set at zero.
- (b) Attention should be paid so that a shoulder line may accord with a stick direction.
- (c) A hand with a stick is supported near a shoulder.
- (d) Lower body is fixed fully enough and soles of both legs are always attached to the floor.

In the next page is added a 'record list'.

Record List of Judoists' Standard Physical Fitness Test

Measurement Date year month day

name		birth date		year month day		age	
position		address					
good subjects		grade in Judo					
number	items		record	number	items		record
A-1	body weight		kg	B-1	side-step		frequency
A-2	height		cm	B-2	reaction time		m sec
A-3	length of upper limb	right	cm	B-3	vertical jump		cm
		left	cm		B-4	grip strength	right
A-4	length of lower limb	right	cm	B-5			back strength
		left	cm		B-6	pull strength	
A-5	girth of neck		cm	B-7		push up	
A-6	girth of chest		cm	B-8	sit up		frequency
A-7	girth of waist		cm	B-9	vital capacity		cc
A-9	girth of upper arm	right	cm	B-10	Harvard step test		
		left	cm		(1) Total exercising time	second	
A-10	girth of forearm	right	cm		(2) from one minute to one and half	frequency	
		left	cm		(3) from two minute to one and half	frequency	
A-11	girth of wrist	right	cm		(4) from three minutes to three minutes and half	frequency	
		left	cm		total	frequency	
				judgment index	point		
A-12	girth of thigh	right	cm	B-11	standing trunk flexion		cm
		left	cm	B-12	flexibility of ankle joint	right	degree
A-13	girth of lower leg	right	cm			B-13	twist of upper body
		left	cm	left	degree		
A-14	Subcutaneous fat		mm				