Quality Control of the implementation of test for Agricultural Machinery in JAPAN

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Agricultural Mechanization in Japan

Samurai ERA (18Century?)

After WW2

1949 Market size 58 billion yen (50 million dollars)
Many poor products were out in the market
Ministry of Agriculture start agricultural machinery test nation wide. Tests were conducted by State and Prefectures experiment stations.

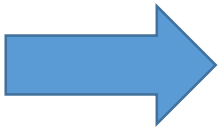
1953 Tests had no legal bases and lack institutional basic

Agricultural Mechanization Promotion Law enforced

1960 Market size 517 billion yen (460 million dollars)
Vast improvement by Importing technology from western countries.
Starting to sell riding type tractors made in Japan

1953
Agricultural Mechanization Promotion Law

- Systematic research of high-performance agricultural machinery
- Promotion and commercialization of agricultural machinery
- Inspection scheme of agricultural equipment
- Implementation of testing and research scheme
- Funding



Enhance agricultural productivity and improve farming

Agricultural Mechanization Promotion Law

Article 6, Paragraph 3

National tests are conducted by Institute of Agricultural Machinery

Institute of Agricultural Machinery
Since 1962

100 staff

Saitama Headquarter

Testing farm

Tsukuba branch

Due to mature development of Agricultural Machinery in Japan "Agricultural Mechanization Promotion Law" was repealed .

Then animal

Now Robot

Aim of Inspection

- Elimination of Inferior Machines
- Guidelines for the introduction of Proper Machine
- Facilitation of Machine Trading
- Secure the Operators Safety
- Guidance for manufactures how to improve

Testing and Evaluation Activities (past)

National Test : Performance test of 10 model machines, Approval test

Repealed

Safety Test : Confirming test of machine safety, Approval test

Repealed

IAM Test : Optional test on the request of applicant

Repealed

OECD Test : International test with OECD test code, for riding type tractor and its safety cab or frame (Since 1966)

Functional Check for Road Traveling Farm Vehicle : 4 model machines such as riding type tractor

Repealed

National Test

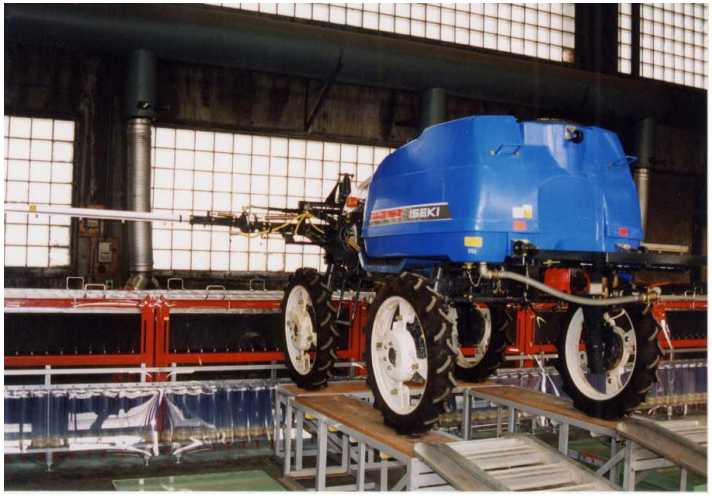
Repealed

Repealed

Label issued by the Ministry as a certification

Drawbar Performance Test (Tractor)

Work Performance test (Rice Transplanter)



Traveling type sprayer

National Test

Repealed

NARO

Speed sprayer

Potato harvester

Beet harvester

Vegetable transplanter

National Test

Repealed

NARO

Combine Harvester

Head feeding type Combine Harvester

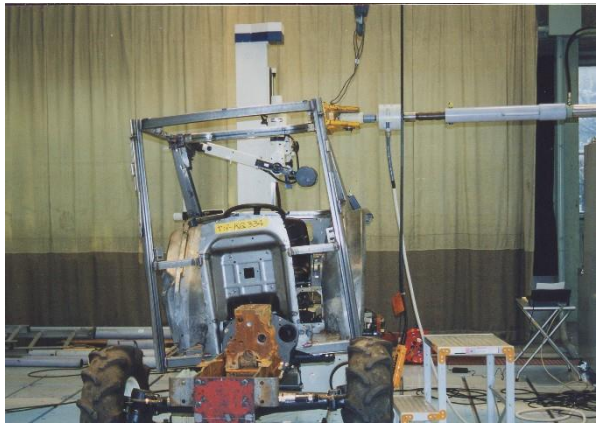
Work Performance test
(Combine Harvester)

National Test of the ROPS

Safety Frame (2 Pillars Type)

Safety Cab

Static Load Test (at the rear end)



Static Load Test (at the side)

Static Load Test (at the top)

Compatible with OECD test

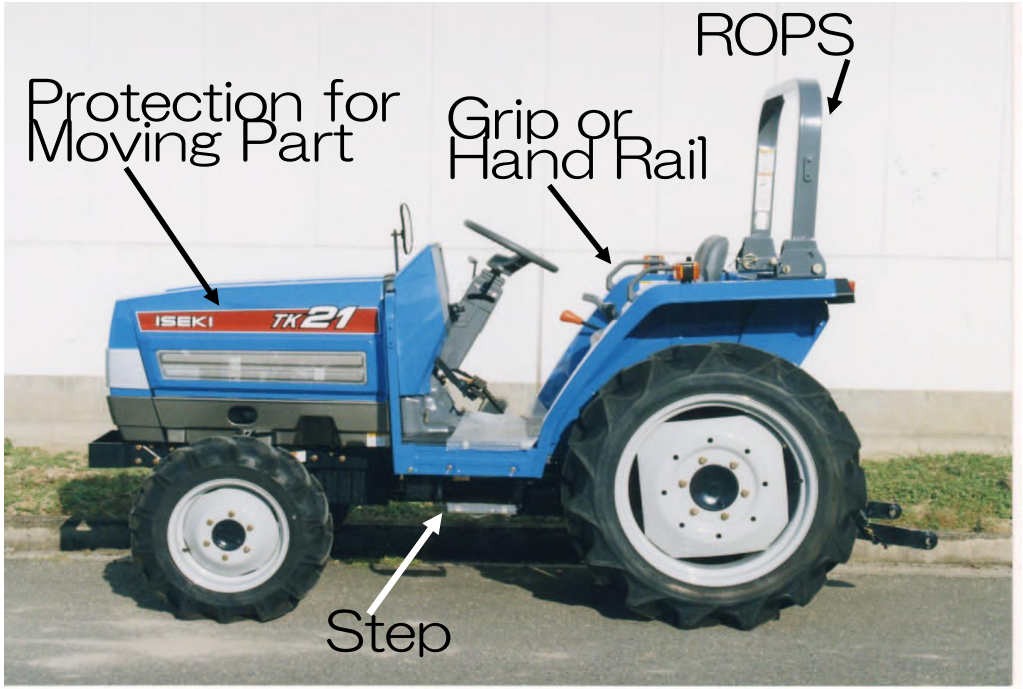
Safety Test

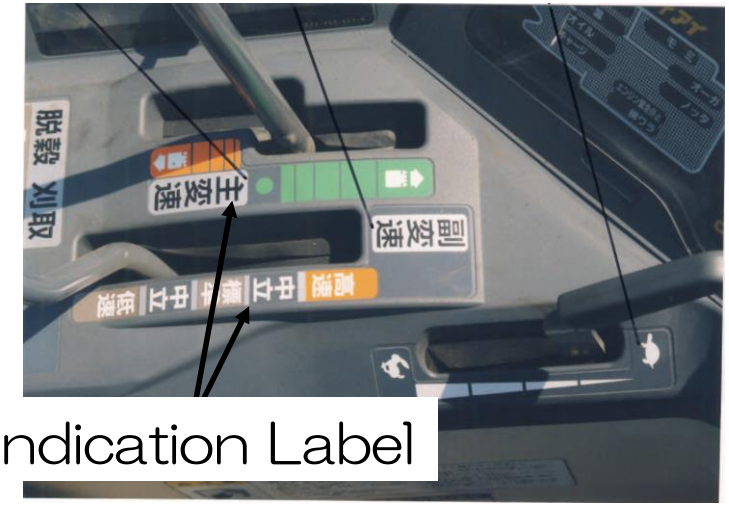
Repealed

NARO

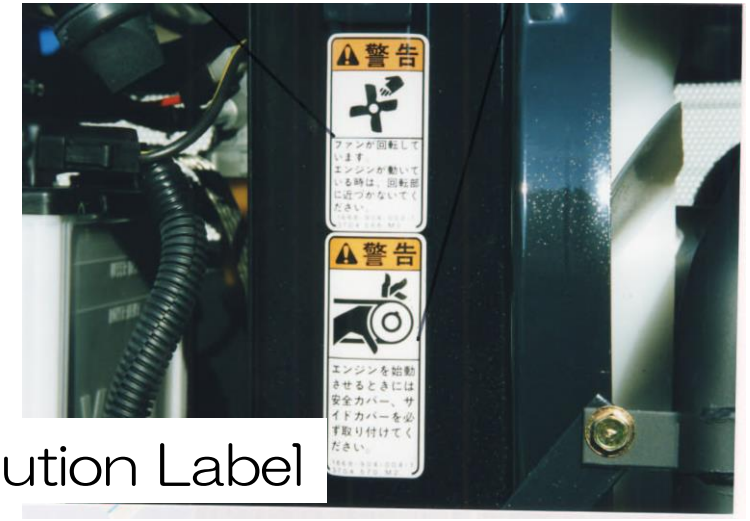
Repealed

Label issued by NARO as a certification





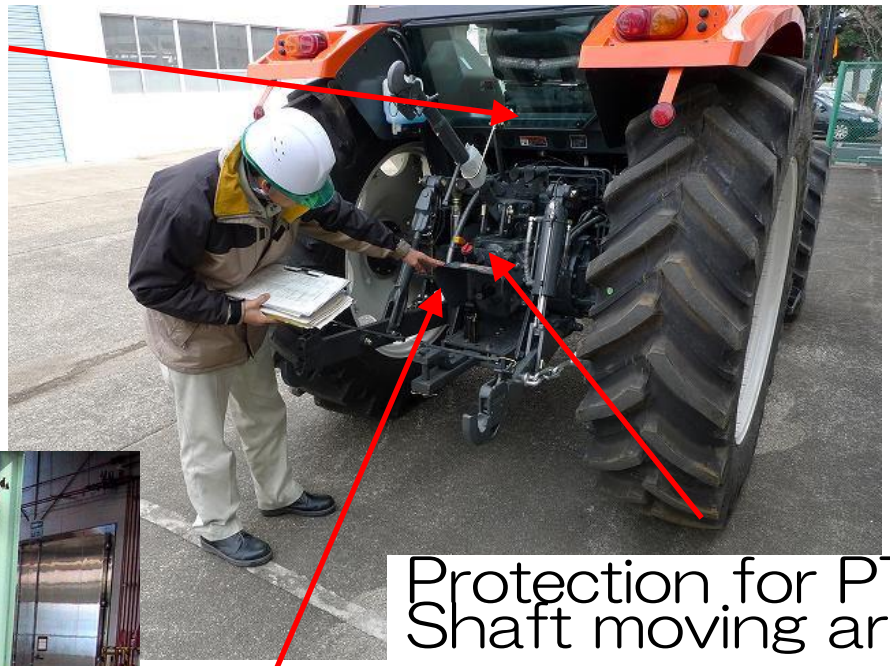
Indication Label



Caution Label

Safety Test Repealed

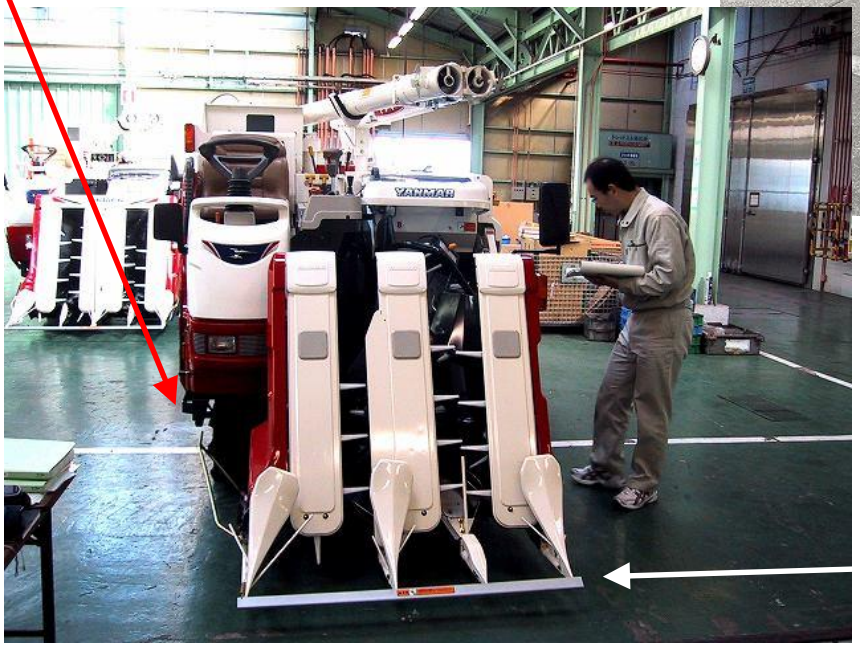
Caution Label for the Implement



Protection for PTO Shaft moving area

PTO Shaft Cover

Proper pitched Steps

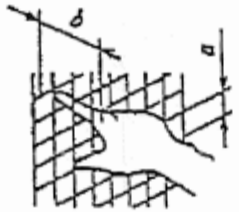
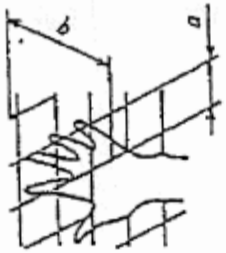
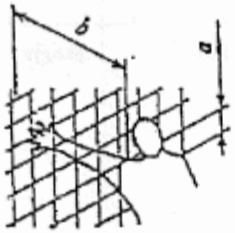


Protection for Blades

Repealed

Safety distance in the case of a net or lattice

Unit: mm

Part of the body	Sketch	Gap width (diameter in the case of circular form)	Safety distance
Fingertip	–	4 < a ≤ 8	b ≥ 15
Finger		8 < a ≤ 25	b ≥ 120
Wrist		25 < a ≤ 40	b ≥ 200
Arm		40 < a ≤ 250	b ≥ 850

Conditions for public procurements

Most of the public funds for the procurement of agricultural machinery required the machine to pass the National test or Safety test.

Label issued by the Ministry as a certification

Label issued by NARO as a certification

Testing and Evaluation Activities (now)

IAM/NARO Test : Test consist of three parts

- Safety test
- ROPS test
- Robot/Automated Agricultural Machinery test

OECD Test : International test with OECD test code, for riding type tractor and its safety cab or frame (Since 1966)

Maintaining “Testing Quality”

Preparation of testing

- Calibration of equipment
- Organizing tools and paper work
- Updating equipment

Scale

Maintaining “Testing Quality”

Even not state of the art
Adequate equipment

Plumb

Coordinate Measuring Machine

Proper use of tools are fundament

Maintaining “Testing Quality”

Passing the torch to the next generation
Test in IAM are conducted by Expert and rookie

Test results differing by tester is not acceptable

Control of “Measurement quality”

<Past> Control of equipment and personnel

- Measurement equipment were checked and calibrated properly
- Calibration was mainly conducted by manufactures
- Assuming “Proper measurements will be obtained by using equipment with proper accuracy”

<ISO/IEC17025 (1999)>

- General requirements for the competence of testing and calibration laboratories
- Management system for quality, administrative and technical operations
- Technical operations

→testing method and validity

→Estimation of measurement inaccuracy