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

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Agricultural Mechanization in Japan

Yamada Tatsuo (1977), Nihon Nousyo Zensyu 26 Nougyou Zue

Samurai ERA (18 Century?)

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
Tsukubua 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Due to mature development of Agricultural Machinery in Japan “Agricultural Mechanization Promotion Law” was repealed.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

Safety Test: Confirming test of machine safety, Approval test

IAM Test: Optional test on the request of applicant

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
National Test

Drawbar Performance Test (Tractor)

Work Performance test (Rice Transplanter)

Traveling type sprayer

Label issued by the Ministry as a certification

Repealed

Repealed
Speed sprayer

Potato harvester

Beet harvester

Vegetable transplanter
Work Performance test
(Combine Harvester)

Combine Harvester

Head feeding type 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

Protection for Moving Part

Grip or Hand Rail

Step

ROPS

Label issued by NARO as a certification

Indication Label

Caution Label
Proper pitched Steps

Caution Label for the Implement

Protection for PTO Shaft moving area

PTO Shaft Cover

Protection for Blades

Safety Test

Repealed
Safety distance in the case of a net or lattice

<table>
<thead>
<tr>
<th>Part of the body</th>
<th>Sketch</th>
<th>Gap width (diameter in the case of circular form)</th>
<th>Safety distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingertip</td>
<td></td>
<td>$4 &lt; a \leq 8$</td>
<td>$b \geq 15$</td>
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<tr>
<td>Finger</td>
<td><img src="image1.png" alt="Sketch" /></td>
<td>$8 &lt; a \leq 25$</td>
<td>$b \geq 120$</td>
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<tr>
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<td><img src="image2.png" alt="Sketch" /></td>
<td>$25 &lt; a \leq 40$</td>
<td>$b \geq 200$</td>
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<td><img src="image3.png" alt="Sketch" /></td>
<td>$40 &lt; a \leq 250$</td>
<td>$b \geq 850$</td>
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</tbody>
</table>
Most of the public funds for the procurement of agricultural machinery required the machine to pass the National test or Safety test.
**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
Maintaining “Testing Quality”

Even not state of the art
Adequate equipment

Plumb
Coordinate Measuring Machine

Proper use of tools are fundamental
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