1st Annual Meeting of the Asian and Pacific Network for Testing of Agricultural Machinery

18th of September 2014

Beijing, China

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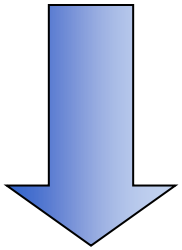
The future of the Agricultural Mechanization in Asia and the Pacific



towards a sustainable use of farm machines

Global Harmonisation of Standards, Test procedures and Certification

- **Standards** →

  As defined by ISO: ***"document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, processes and services are fit for their purpose".....***
  .... and CEM adds: ***"standards are created by bringing together all interested parties such as manufacturers, consumers and regulators of a particular material, product, process or service"***

- **Test procedures** → **A test is a procedure for critical evaluation**

- **Certification** →

  The provision by an indipendent body of written assurance (a certificate) that the product, service or system in question meets specific requirements"

International Networks for Testing

ENTAM

OECD
BETTER POLICIES FOR BETTER LIVES

ANTAM
ESCAP

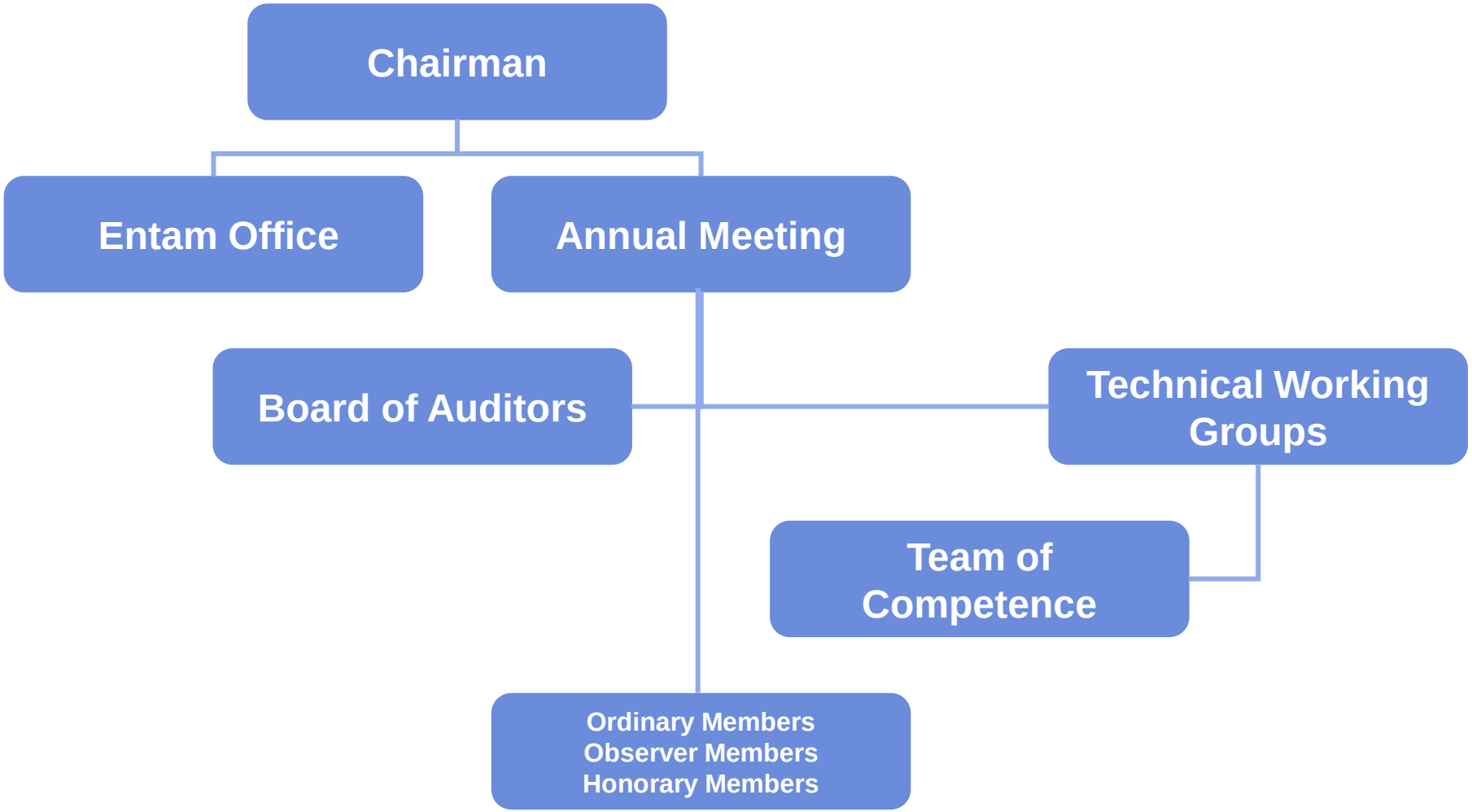
International Cooperation

ENAMA is a founder member of ENTAM (European Network for Testing of Agricultural Machines). It's an international effort to guarantee independent and harmonised testing systems

Regarding the voluntary or compulsory testing in the field of agricultural engineering ENTAM testing stations assess:

- **performances**
- **safety**
- **environmental protection**
- **animal welfare requirements in animal husbandry**

ENTAM Organizational Structure



ENTAM Main activities

- ***Studies and researches:*** ***improving the performance of agricultural machinery and sharing best practices;***
- ***Innovation:*** ***development of best technologies;***
- ***Standardisation:*** ***common testing activity and mutual recognition of the tests on the basis of common testing procedures or methodologies;***
- ***Certification:*** ***in accordance with OECD Codes.***

ENTAM is currently made up of 11 members, 1 honorary witness (FAO) and 4 observer members (INTA, AFMSPTC, CEA, VIM) respectively from Argentina, Bulgaria, Brazil, Russia

Observer Members

Honorary Witness:

Ente Nazionale Meccanizzazione Agricola

ENTAM

ENTAM - Test Report

Sprayer type: Trailed Field Crop Sprayer
Trade mark: CAFFINI
Model: Prestige 2800/24

Manufacturer:
Caffini spa
Via Marconi, 2
I - 37050 Palù (VR)

Test report: 05/157

October 2009

Assessment table

No.	Contents	Assessment 2200 l	2800 l	3300 l
1	Spray tank surface roughness	xxx	xxx	xxx
2	Spray tank over volume	x	x	x
3	Volume of total residual	xx	xx	xx
4	Spray tank contents gauge up to 20% Filling	x	xxx	x
5	Spray tank contents gauge from 20% Filling	xxx	xxx	xx
6	Agitation system (deviation of even solution)	x	x	xx
7	Width of nozzle bar section	x		
8	Boom height adjustment range	x		
9	Deviation of pressure gauge	x		
10	Deviation of flow meter	xx		
11	Regulation speed	xx		
12	Transverse distribution	xx		
13	Rinsing water tank	xx	xx	xx
14	Deviation of volume/hectare adjustment device (spray computer) from desired value	xx		
15	Repeatability of volume/hectare adjustment device (spray computer)	xx		
16	Pressure drop between manometer and nozzle	xx		
17	Deviation of single nozzle output from table	xxx		

Note: The assessment keys are listed below. All detailed results are in the following test report.

No.	unit	x	xx	xxx
1	µm	>70-100	30-70	<30
2	%	5-8	>8-12	>12
3	of allow.value	>2/3-3/3	1/3-2/3	<1/3
4	%	7.5-5.0	5.0-2.5	<2.5
5	%	5.0-4.0	<4.0-2.0	<2.0
6	%	>10-15	5-10	<5
7	m	4.5-6	>3-4.5	3 or less
8	m	1-1.5	>1.5-2.0	>2.0
9	bar	>0.10-0.20	>0.05-0.10	0.00-0.05

No.	unit	x	xx	xxx
10	%	4-5	2-4	0-<2
11	%	>7-10	>3-7	0-3
12	CV	>7-9	4-7	<4
13	% of tank vol.	10-12	>12-14	>14
14	%	>4-6	2-4	<2
15	%	>2-3	1-2	<1
16	%	>7-10	3-7	<3
17	%	>7-10	3-7	<3

Free download of the complete test report under: www.ENTAM.net
or: www.ENAMA.it

Description of implement

The implement is a trailed sprayer for use on herbaceous crops. The sprayer is attached to the tractor through the towing hook (steering drawbar optional).
The axel is fitted by hydraulic suspension.
The frame of the machine is made of painted steel, the main and auxiliary tanks are made of polyethylene. A gauge is located on the front left of the main tank. The liquid level is indicated by a transparent external tube with float. Agitation is through hydraulic stirrers located on the bottom of the tank. The tank is completely emptied using a valve located on the left side. Access to the main tank is through an ad hoc raised platform situated on the left side. The implement has a range of models, having a main tank nominal capacity of 2200, 2800 and 3300 l.
The implement is powered through the tractor PTO having a rated speed of 540 rpm.
The implement has a diaphragm pump located in front of the main tank. Pressure regulation and liquid dispensing are controlled using electrically operated controls that can be placed in the tractor cab.
There are 2 filters: one suction filter, which can be inspected even if the main tank is full, and one pressure filter.
The boom, having a working width of 18, 21, 24, 27 and 28 m, is made out of painted steel. During transport it is folded on the side of the tank using ad hoc supports used to block the implement. The boom optionally can be fitted with air assistance. The air flow is obtained by a 800 mm axial fan hydraulically driven.
The boom is attached to the support frame through a parallelogram connection, while the boom support is a collapsible trapezoidal joint. Adjusting of the boom position and opening-closing operations are electro-hydraulically operated through a control panel that can be positioned close to the driver's seat or using directly the tractor's hydraulic distributors. The blocking of boom oscillation is automatic when the boom is being closed.
Liquid is sprayed under pressure. The nozzle holders are equipped with a diaphragm antidrip device.
The valves for managing the hydraulic circuit (spraying/cleaning) are located in the front left side.
The pressure gauge for checking operating pressure is positioned on the front of the main tank. It has a diameter of 100 mm, end scale of 25 bar and is in intervals of 0.1 bar.
An induction hopper is installed on the left side of the machine for the pre-mixing of chemical products.

Induction hopper for loading chemical products

Valve unit

Boom attachment

External cleaning

Sizes and weights

	extension	lenght (mm)	width (mm)	max height (mm)	empty weight (kg)	total weight (kg)
a	PRESTIGE 2800/24	6050	2500	3300	3110	6150
b	PRESTIGE 2800/18	5450	2500	2900	3045	6085
c	PRESTIGE 2800/18Air	6400	2500	2900	3145	6185
d	PRESTIGE 2800/20	5450	2500	2900	3085	6125
e	PRESTIGE 2800/20Air	6400	2500	2900	3185	6225
f	PRESTIGE 2800/21	5450	2500	3300	3095	6135
g	PRESTIGE 2800/21Air	6400	2500	3300	3195	6235
h	PRESTIGE 2800/24Air	7000	2500	3300	3210	6250
i	PRESTIGE 2800/27	6550	2500	3600	3175	6215
j	PRESTIGE 2800/27Air	7500	2500	3600	3275	6315
k	PRESTIGE 2800/28	7050	2500	3600	3185	6225
l	PRESTIGE 2800/28Air	8000	2500	3600	3285	6325
m	PRESTIGE 3300/21	5450	2500	3300	3210	6750
n	PRESTIGE 3300/21Air	6400	2500	3300	3310	6850

	extension	lenght (mm)	width (mm)	max height (mm)	empty weight (kg)	total weight (kg)
o	PRESTIGE 3300/24	6050	2500	3300	3225	6765
p	PRESTIGE 3300/24Air	7000	2500	3300	3325	6865
q	PRESTIGE 3300/27	6550	2500	3600	3290	6830
r	PRESTIGE 3300/27Air	7500	2500	3600	3390	6930
s	PRESTIGE 3300/28	7050	2500	3600	3300	6840
t	PRESTIGE 3300/28Air	8000	2500	3600	3400	6940
u	PRESTIGE 2200/18	5450	2500	2900	2970	5410
v	PRESTIGE 2200/18Air	6400	2500	2900	3070	5510
w	PRESTIGE 2200/20	5450	2500	2900	3010	5450
x	PRESTIGE 2200/20Air	6400	2500	2900	3110	5550
y	PRESTIGE 2200/21	5450	2500	3300	3020	5460
z	PRESTIGE 2200/21Air	6400	2500	3300	3120	5560
aa	PRESTIGE 2200/24	6050	2500	3300	3035	5475
ab	PRESTIGE 2200/24Air	7000	2500	3300	3135	5575

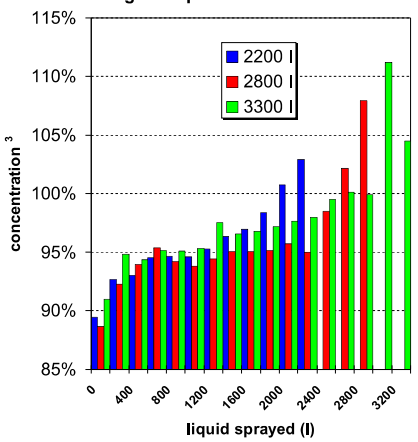
Main results of functional tests

Residual (l)

in the tank			
horizontal			
with back flow - with agitation			15.50
with back flow - without agitation			- -
without back flow - without agitation			6.70
inclined to right			5.90
inclined to left			5.90
inclined to rear			5.80
inclined to front			6.80
in the hoses: dilutable			9.90
dilutable residual [1]			17.10
in the hoses: non dilutable [2]			
boom width	***18 m***	***24 m***	***28 m***
	9.10	13.50	15.40
total residual			
boom width	***18 m***	***24 m***	***28 m***
	26.20	30.60	32.50

[1] Liquid that can flow back into the main tank and can be diluted by the washing tank contents
[2] Liquid that not can flow back into the main tank

Agitator performance



[3] Copper oxychloride concentration measured during the tank empying, after 16 hours standing and 10 minutes of agitation.

Pressure gauge

diameter	100 mm
distance between marks	0.10 bar
accuracy	0.15 bar

Fan 800 mm - 2300 rpm

boom	***21 m***	***24 m***	***28 m***
flow rate (m^3/h)	25 480	32 880	37 810
mean velocity (m/s) [4]	6.1	5.9	4.6
mean direction [4]		82° - 98°	

[4] Measured 0,5 m from the outlet

Transverse distribution

Nozzle TeeJet XR11004 @ 0.60 m height

working pressure (bar)	CV (%) boom type					
	18	20	21	24	27	28
2.0	6.60	6.60	6.90	6.90	6.40	6.50
3.0	5.80	5.90	6.10	6.40	6.20	6.30
5.0	5.60	5.80	6.00	6.30	6.10	6.20

Testing of Safety

The machine is endowed with CE marking, an identification plate, safety pictograms, an instruction handbook and an EC manufacturer's declaration of conformity.
The implement meets the requirements of Enama safety regulations cat. 05.05 – Crop protection machines: Trailed boom sprayers - rev. 2.4 of 1/04/2008, containing the following harmonised standards and technical specifications: UNI EN 907: 1998,UNI EN 1553: 2001, ISO 11684: 1995. The relative documentation has been filed.

Explanation on testing

Testing takes place according to the Technical Instructions for ENTAM-Tests of Field Crop Sprayers (Rel 3). This procedure was developed by the competent testing authorities of the European countries participating in ENTAM and is based on the CEN standard EN 12761 "Agricultural and forestry machinery – Plant protection equipment for the application of plant protection products and liquid fertilizers". This test is only a technical performance test which takes place without an accompanying field test.
The test results apply only to the tested appurtenances of the sprayer. Statements on the behaviour of the sprayer with different appurtenances cannot be derived from this results.

Responsibility and recognition

Performing competent authority:

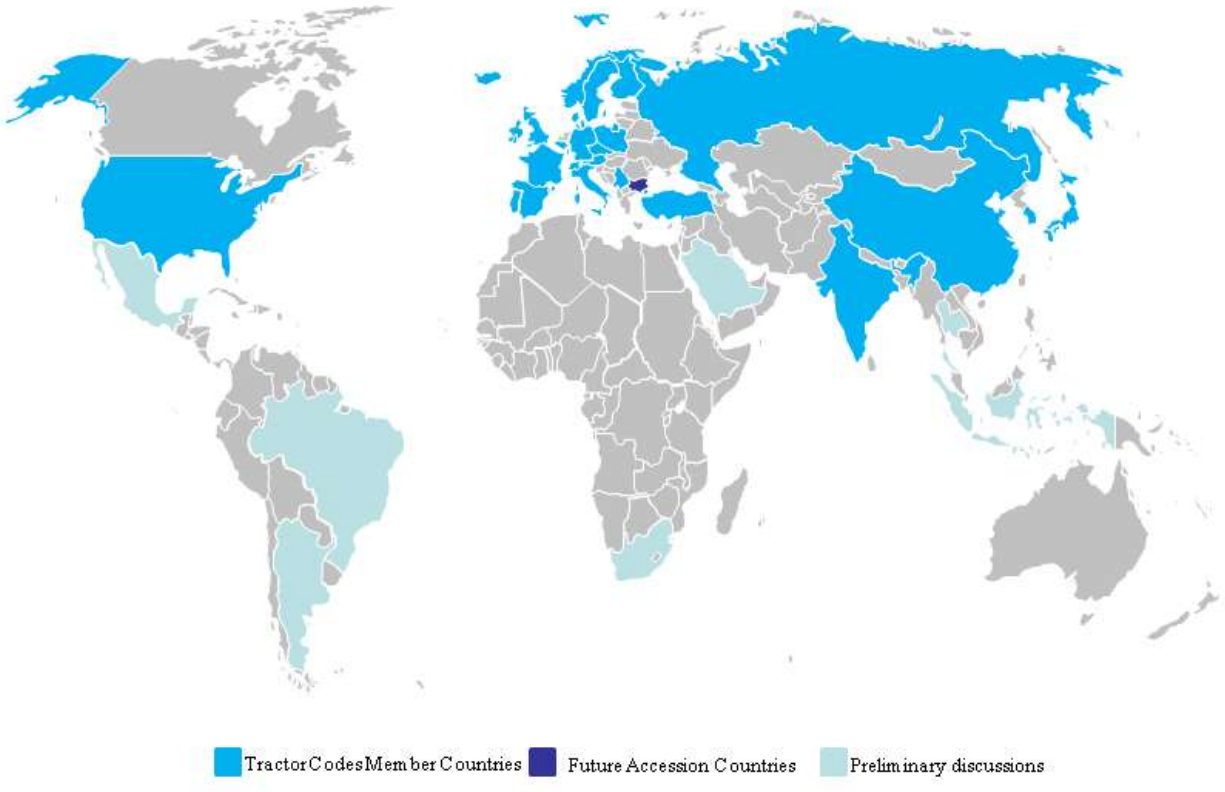
Crop Protection Technology DEIAFA - meccanica
Via L. da Vinci, 44
I -10095 Grugliasco (TO)

This test is recognized by the ENTAM members:

ART - Agroscope Reckenholz-Taenikon Research Station - SWITZERLAND	I-43.09
AU/DAE - University of Aarhus - Department of Agricultural Engineering - DENMARK	AU DAE ENTAM 2009-13
Cemagref -Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement – FRANCE	CEMAGREF/ENTAM/ 09/025
CMA - Centre de Mecanització Agrària - SPAIN	EPH005/09
HBLFA Francisco Josephinum Wieselburg - BIOMASS | LOGISTICS | TECHNOLOGY (FJ - BLT) - AUSTRIA	051/09
JKI - Julius Kühn-Institut (formerly BBA) – GERMANY	ENT-I-07/09
MGI - MEZOGAZDASÁGI GÉPESÍTÉSI INTÉZET Hungarian Institute of Agricultural Engineering - HUNGARY	I-23 2009
N.AG.RE.F - National Agricultural Research Foundation - GREECE	ΛΕ/122/01/ΖΖ
PIMR - Przemyslowy Instytut Maszyn Rolniczych - Industrial Institute of Agricultural Engineering - POLAND	PIMR-31/ENTAM/09

OECD Tractor Codes

Countries Participating in the OECD Tractor Codes 2012



OECD Codes

Code 2

Testing of agricultural and forestry tractor performance.

Code 3

Testing of the strength of **protective structures** for agricultural and forestry tractors **(dynamic test).**

Code 4

Testing of the strength of **protective structures** for agricultural and forestry tractors **(static test).**

Code 5

Noise measurement at the driver's position(s).

Code 6

Testing of **front-mounted protective structures on narrow-track wheeled** agricultural and forestry tractors.

Code 7

Testing of the **rear-mounted protective structures on narrow-track wheeled** agricultural and forestry tractors.

Code 8

Testing of **protective structures on tracklaying tractors**.

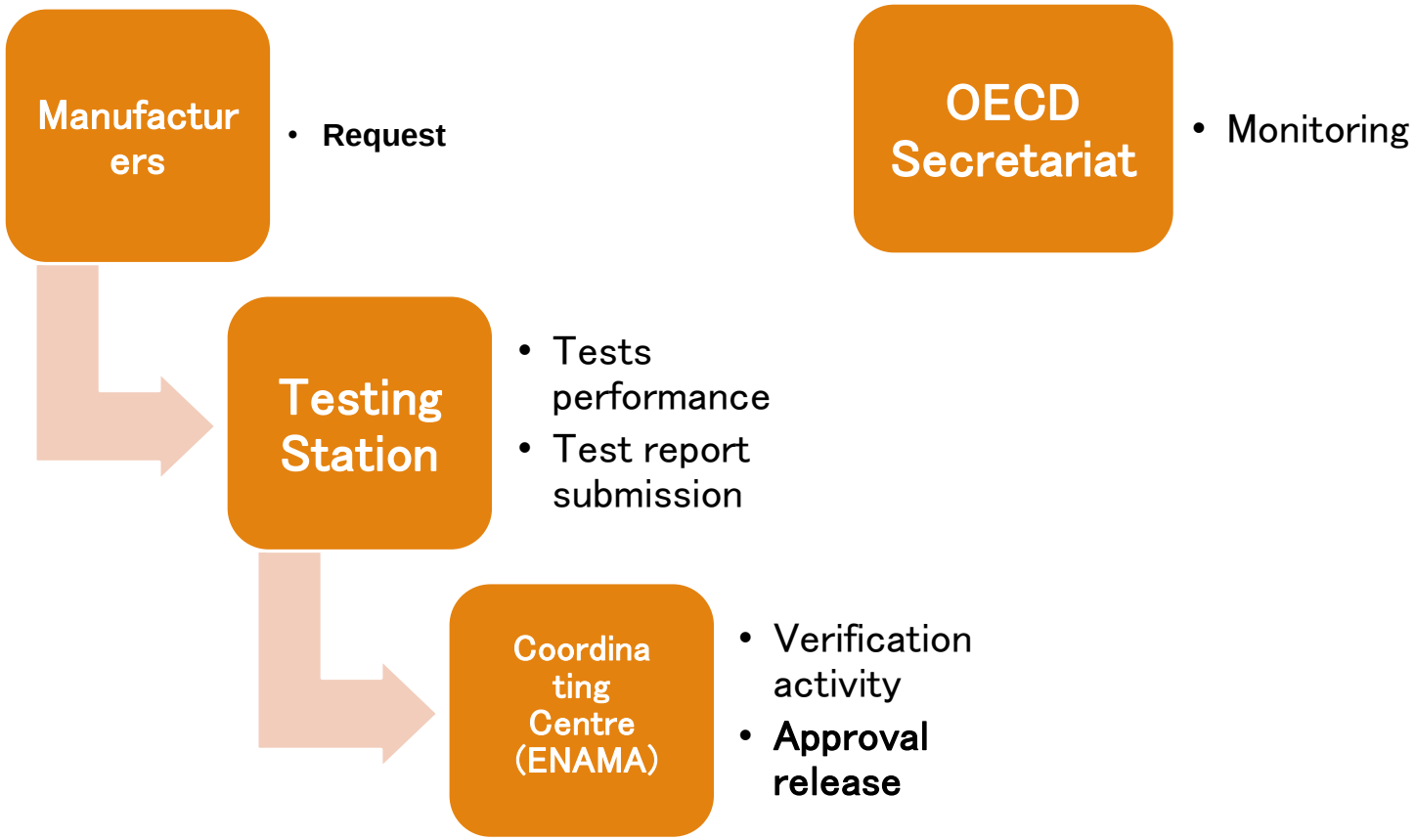
Code 9

Protective structures for telehandlers (testing of falling-object and roll-over protective structures fitted to self-propelled variable reach all-terrain trucks for agricultural use).

Code 10

Testing of **Falling object protective structures**

Approval process

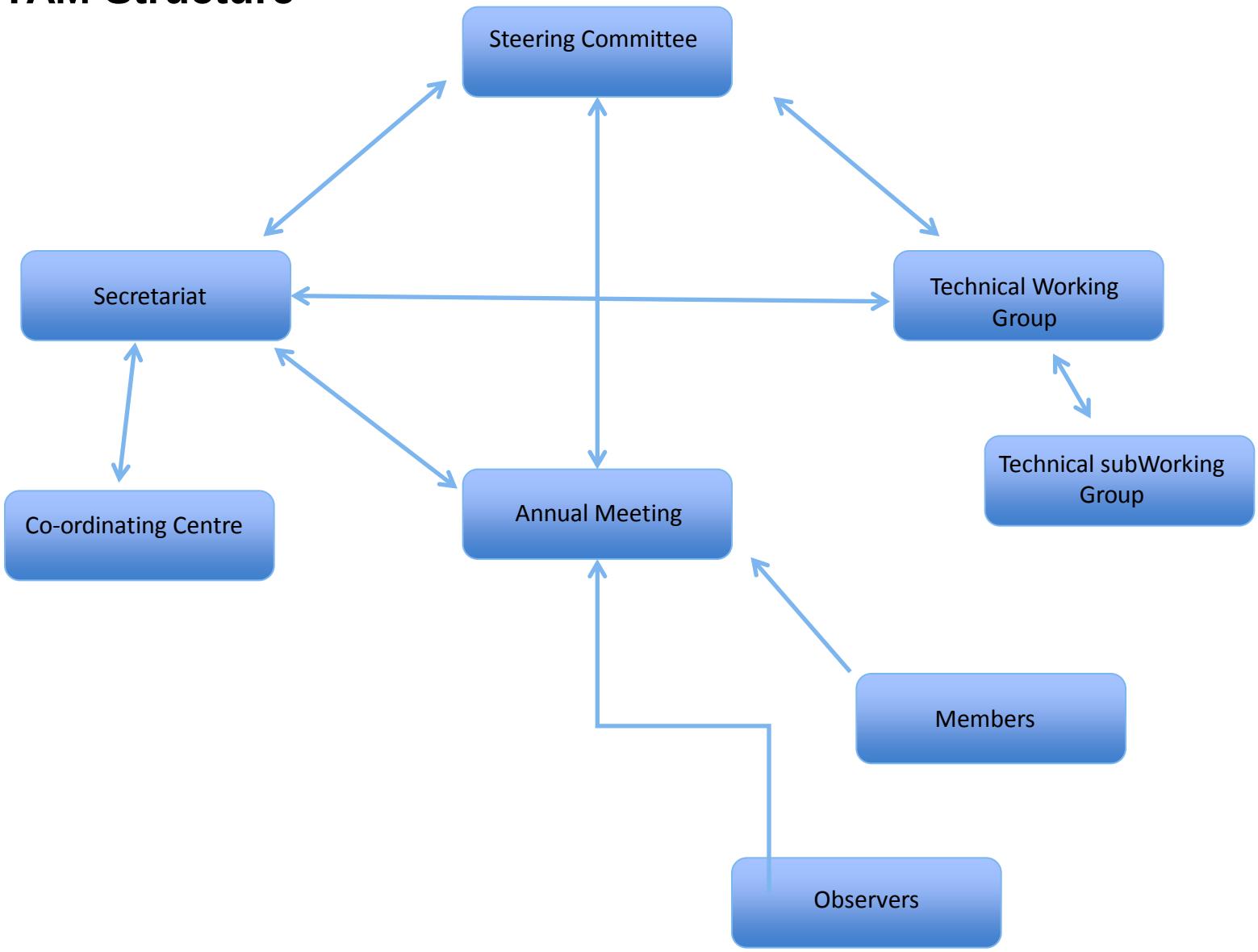


OECD
Coordinating Centre

To ensure

- Test stations fullfill the Codes requirements
- Accurate and Fast Verification of test reports
- Traceability and data availability
- Guarantee and protection of all parts involved

ANTAM Structure

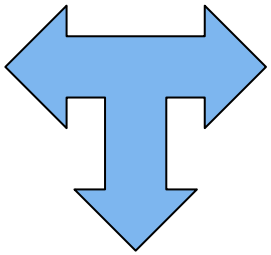


ANTAM objectives

- The ***Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM)*** stands for the connection between UN agencies and government representatives and national testing stations of agricultural machinery of participating countries, research institutes, associations related to agricultural mechanization and farmers organizations.
- ANTAM is aimed to **promote harmonization of testing codes and standards of agricultural machinery** applied in the Asia-Pacific region that address quality, performance, occupational safety and environmental aspect of agricultural machinery.
- It provides a ***regional platform*** for member countries to exchange technologies, share knowledge, expertise and best practices to upgrade the existing testing capacity and promote quality of agricultural machinery.

ANTAM Function

- Be the ***platform*** for national testing centres/stations
- Provide a discussion forum ***for developing and harmonizing testing codes and standards*** of sustainable agricultural machinery
- Provide a ***database and reference point*** for agricultural machinery testing
- Facilitate the adoption of an ***agreed methodology***
- Act as a ***coordinating and indipendent agency*** to guarantee a fair adoption of procedures and test results
- Provide information to public and private stakeholders propoer information



OECD
BETTER POLICIES FOR BETTER LIVES

Network as Antam will help:

- **WTO Agreement on Technical Barriers to Trade:** *"Development and trade for a sustainable agriculture, avoiding unnecessary obstacles"*
- Overcome barriers to regional and global trade including successful strategies for stakeholders to enter new markets
- Good performing tested machines
- **Guarantee all stakeholders (public and private)**
- Sharing of expertise

In order to make the work more efficient it is necessary to:

1 Nominate Members of theTWG

2 Identify priorities

3 Propose a clear work program

4 Identify a Technical Reference Centre acting as an independent body

5 Provide results before the 2° Annual Meeting of ANTAM

1 Nominate Members of theTWG

Every Member country should nominate one/two expert/s to participate in the Technical Working Group (TWG) and send her/his name and references to the Secretariat before the end of October 2014.

Then the ANTAM Secretariat should prepare a list of the representatives in the TWG and organise the work.

2 Identify priorities

Member Countries decided during the 2013 Meeting to consider the following priorities of machines to be included in the ANTAM activities: tractors (ROPS), sprayers (with priority to knapsack sprayers), cultivators, paddy treshers, irrigation equipment.

In this first stage to be performed during 2014 and 2015 the methodologies and tests will be developed on tractors (ROPS) and sprayers (knapsack sprayers). The Steering Committee will review the technical papers and proposals will be circulated for comments.

3 Propose a clear work program

The Technical Working Group should approve and provide to the Secretariat before the end of April 2015 the testing procedures on ROPS for tractors and knapsack sprayers. These testing procedures should be considered as version 0.1 to be presented for official approval during the second Annual Meeting of ANTAM.

4 Identify a Technical Reference Centre (TRC) acting as an independent body

Member countries should decide on the appointment of an independent TRC centre providing the support for the technical approval of test report on the basis of the testing procedures developed by the TWG. The TRC actvity may be performed by ENAMA, given its role as a founding Member of the ENTAM (*European Testing for Agricoltural Machines*) network and Co-ordinating centre of the OECD Tractor Codes. ENAMA should also have a liasion role for further co-operation with OECD, ENTAM, FAO and UNIDO.

TECHNICAL REFERENCE CENTRE

The Technical Reference Centre (TRC) will be established with the aim to check the technical content of incoming reports performed according to the ANTAM procedures and to support the Secretariat.
The TRC will be an independent body not involved in the performance of ANTAM testing activity in order to assure a third party assessmen.
The TRC will have no decision making responsability and will have no influence on the trade in Member countries.
The TRC will provide for close relation with OECD, ENTAM and other international networks in the field of testing agricultural machines in order to improve the efficiency of ANTAM activities.

5 Provide results before the 2° Annual Meeting of ANTAM

The Member countries participating in the Technical Working Groups may provide at least 1 test report regarding ROPS for tractors and knapsack sprayers based on the ANTAM testing procedure version 0.1. The Steering Committee together with the TRC should review the test reports and make suggestions on the presentation and format according to international regulations.

The second Annual meeting of ANTAM should approve the format and how to present results of the activity to stakeholder and public/private Institutions.

For further informations, visit:

http://www.entam.net/index.php
http://www.oecd.org/agriculture/code/tractors.htm
http://www.enama.it/it/index.php

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