



Ballast Water Commissioning Testing

Industry Guidance to Support Practical Implementation

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08 December 2020

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Chair, BEMA Technical Committee*

Outline

- Regulatory Overview
 - Let's define the term "commissioning"
- Interested Stakeholders & Relationships
- Clarifying the Details
 - What is commissioning testing and its purpose?
 - The "Who", "When" and "Where" of commissioning testing
 - Roles & Responsibilities: Owner, Class, Flag Administration, BWMS manufacturer
 - ✓ Costs, critical scheduling / planning, and technical aspects
 - Testing Methods – detailed vs. indicative
- Training Considerations
- Selecting the Testing Laboratory
- A non-compliant commissioning testing result
 - Troubleshooting
- If commissioning testing can't be completed at the time of BWMS installation...what next?

Regulatory Overview

QUESTION: What does “commissioning” mean??

ANSWER: Different things to different stakeholders....

Commissioning by
BWMS Manufacturer
(EQUIPMENT - *purchase & install*)

- BWMS manufacturer process completed after BWMS installation
- Manufacturer equipment check according to their own installation & commissioning procedures.
- Completed before BWMS hand-over to the vessel crew

Commissioning by
Vessel Classification Society
(EQUIPMENT - *verify installation*)

- Class survey to verify:
 - ✓ Class requirements are met (i.e. “steel vessel rules”)
 - ✓ Proper and safe BWMS installation per manufacturers specifications
 - ✓ Statutory requirements are met (i.e. on behalf of Flag State as Recognized Organization (RO))
 - ✓ Completed before BWMS hand-over to vessel crew

IMO Commissioning Testing
Vessel Owner
(BIOLOGICAL EFFECTIVENESS -
test installation)

- Biological commissioning test to verify proper BWMS operation.
- Test to evaluate if IMO D-2 discharge standards are met
- Completed after equipment installation verified & BWMS hand-over to crew
- Testing completed under review of Flag State or Recognized Organization

NOTE: IMO Commissioning Testing is the focus of this BEMA Guidance.

BWMS Commissioning vs Commissioning Testing

BWMS maker → vessel

Vessel → Flag State Administration



Regulatory aspects

- Class rules, SOLAS Regulations
- International standard IEC 60092-502



Give installation process the required attention

- Major equipment installation / retrofit
- Large investment & expense



Schedule

- Avoid waiting to end of shipyard period
- Multiple parties to coordinate
- Crew training



Regulatory aspects

- IMO: BWMS Code, BWM.2/Circ.70
- Flag state Administration



Schedule

- Agree on test plan *in advance* of testing
- Check practicability at installation site; water quality vs SDL of the BWMS
- Multiple parties to coordinate



Testing for D-2 compliance

- Third party tests only – approved testing lab
- Use of suitable indicative tests or detailed
- Reliable chain of custody is vital



Important:

BWMS Commissioning + Commissioning Test = Complete commissioning procedure = IBWMC

Regulatory Overview

WHY do I need to perform IMO Commissioning Testing?

- BWMS Commissioning Testing is prescribed by the “BWMS Code”, IMO [Resolution MEPC.300\(72\)](#)

WHO is requiring IMO Commissioning Testing?

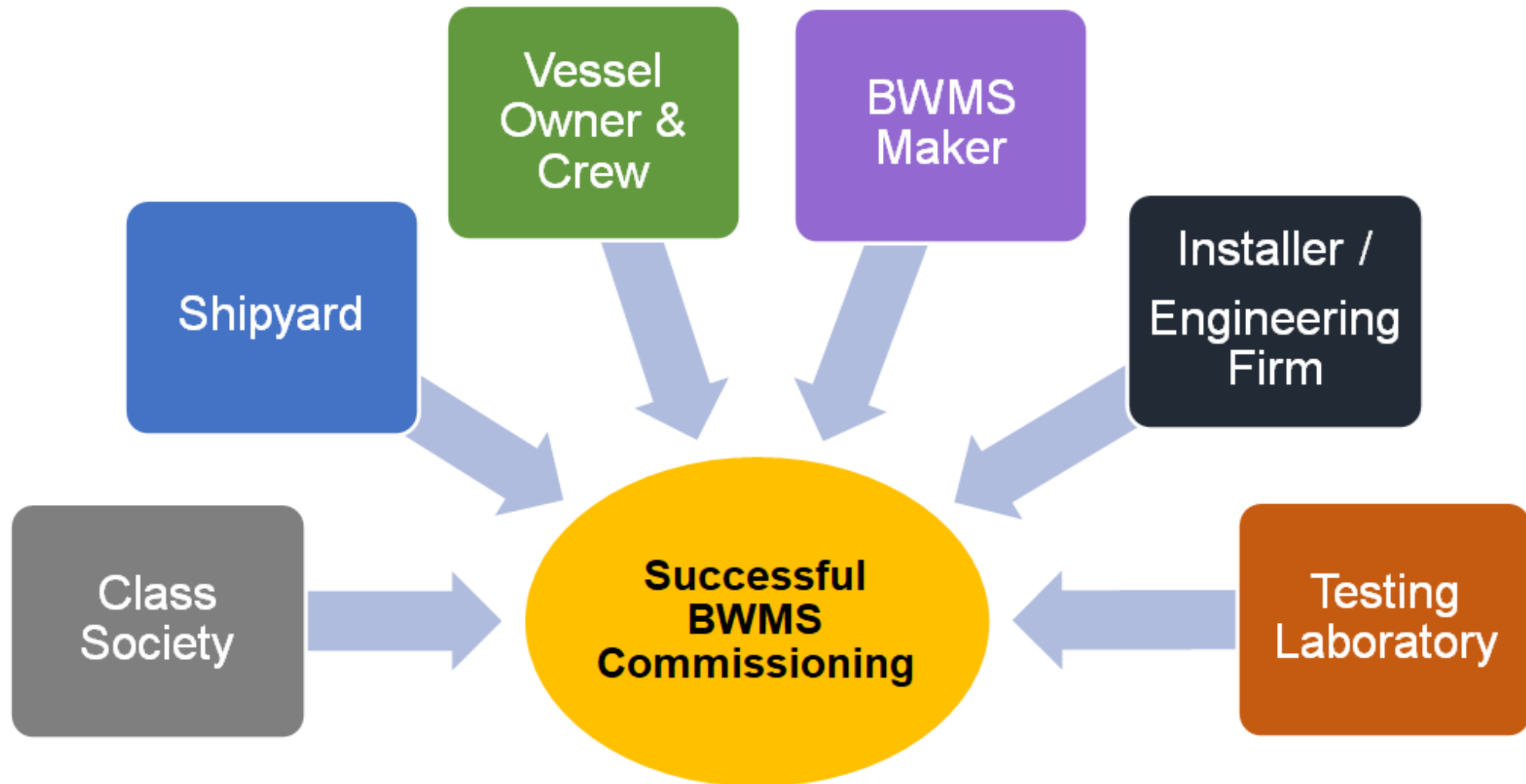
- Currently, the following National Administrations (before IMO entry into force):
 - ✓ Australia
 - ✓ Cyprus
 - ✓ Greece
 - ✓ Panama
 - ✓ Singapore
- **List may change – confirm requirements with vessel Flag Administration****

HOW do I perform IMO Commissioning Testing?

- IMO Circular [BWM.2/Circ.70/Rev.1](#) - “*Guidance for the Commissioning Testing of Ballast Water Management Systems*”
- Approved at MEPC 75, with entry into force date of 1 June 2022

NOTE: IMO Commissioning Testing is not the same as US EPA Vessel General Permit (VGP) testing.

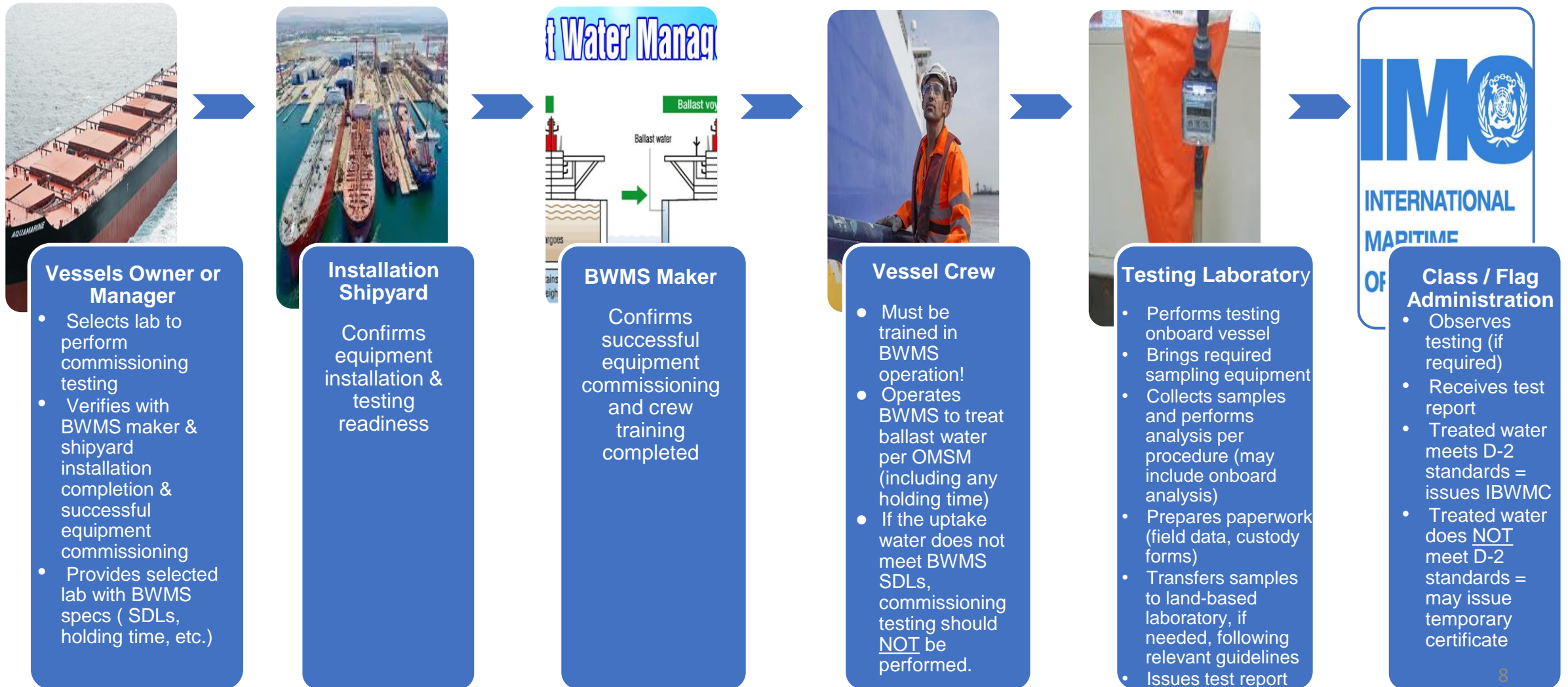
Interested Stakeholders & Relationships



Clarifying the Details

- **WHAT** is the purpose of IMO BWMS Commissioning Testing (BWCT)?
 - “...to validate the installation of a ballast water management system (BWMS) by demonstrating that its mechanical, physical, chemical and biological processes are working properly.” ([BWM.2/Circ.70](#))
 - Commissioning testing is **not** intended to validate the design of type-approved BWMS that are approved by the Administration (BWM.2/Circ.70)
- **WHO** is responsible for BWCT? All stakeholders!! (also refer to slides 3, 4 & 6)
 - Vessel Owner - selects testing laboratory, coordinates & schedules BWCT, ensures crew training is completed, financially responsible for BWCT
 - BWMS manufacturer - completes equipment commissioning procedures, provides crew training, and BWMS hand-over to crew
 - Class - determines selected testing laboratory is qualified & oversees BWCT on behalf of Flag Administration; class surveyor may be present onboard to observe BWCT
 - Flag Administration - ensures BWCT requirements are clear for vessel owner, receives testing report, issues IBWMC on successful completion

Roles & Responsibilities Matrix



Clarifying the Details

- **WHEN** is BWCT required?
 - Completion of testing is required for vessel to use installed BWMS and receive an IBWMC.
- **WHERE** is BWCT performed?
 - May be done in the shipyard, IF ambient water quality conditions are appropriate for BWMS SDL's
 - Can be done after vessel leaves shipyard; requires class / Flag issuance of short-term IBWMC; additional scheduling considerations by owner / testing laboratory
- **HOW** is BWCT performed?
 - Ambient harbor water is analyzed during ballast uptake to determine organism concentration before treatment (no minimums required).
 - Treated ballast water discharge is sampled after the complete treatment process, including any required holding time. All organism size classes are evaluated (i.e., $>50\ \mu\text{m}$, $\geq 10\ \mu\text{m}$ - $\leq 50\ \mu\text{m}$, microbial indicators)
 - BWM.2/Circ.70 specifies use of 'indicative analysis' methods; 'detailed analysis' methods may also be used
 - Challenge: there are currently no 'indicative analysis' methods verified according to an international standard
 - Solution: many testing laboratories continue using detailed analysis methods. In cases where indicative analysis is performed and shows potential non-compliance, a detailed analysis should be carried out as these results would currently be expected to prevail over indicative analysis results.

Clarifying the Details

➤ **HOW** is BWCT completed? (continued)

An indicative analysis means a compliance test that is a relatively quick indirect or direct measurement of a representative sample of the ballast water volume of interest:

A detailed analysis means a compliance test that is likely to be more complex than indicative analysis and is a direct measurement of a representative sample used to determine the viable organism concentration of a ballast water volume of interest. The result of such measurement:

NOTE: For more details, refer to IMO's Guidance on ballast water sampling and analysis ([BWM.2/Circ.42/Rev.1](#))

Training Considerations

- Remember...**VESSEL CREW** is required to operate the BWMS during commissioning testing
 - BWMS manufacturer, vessel owner and crew **ALL** must be involved to ensure proper training is completed.
 - Vessel owner should ask in advance how much time BWMS manufacturer needs to complete training **AND** plan sufficient time for training into the shipyard schedule.
- ***If the training is rushed or incomplete, crew will not be prepared for commissioning testing - plan ahead!***



Courtesy of Ecochlor



Courtesy of ERMA FIRST

Selecting the Testing Laboratory

Selecting a testing laboratory to undertake BWMS commissioning testing requires the evaluation of a suitable and qualified organization.

- Liaise with Flag or Class for the appropriate testing laboratory, before engaging their services.

Nowadays many testing laboratories have received acceptance or approval from certifying authorities and/or class societies for performing commissioning testing. Those should be the ones preferred by a shipowner or manager.

In case a testing laboratory is not approved, the vessels Flag Administration and class accept that, then the lab should submit, to the satisfaction of the Administration and/or class, prior to sampling the following:

- Sampling and analysis procedures that consider the following: [MEPC.300\(72\)](#), [BWM.2/Circ.42/Rev.1](#)
- Quality Management Plan
- Quality Assurance Project Plan / Test Quality Assurance Plan
- Chain of Custody Forms (COC)

Non-Compliant Test Result - Troubleshooting

Root Cause	Troubleshooting
Uptake water outside BWMS SDL's	Repeat the sampling in an area where SDL are met. Such sampling and analysis shouldn't be performed on first stage.
Sample wasn't drawn from the G2 sampling port.	Make sure that G2 sampling port is installed and labeled properly.
BWMS was not operating according to maker specifications	BWMS maker should re-commission the BWMS in order to bring into proper operation.
BW tank contamination:	
A. Ballast tank not cleaned as part of dry dock work	<ol style="list-style-type: none"> 1. Clean BW Tanks prior any official sampling 2. Flush the sampling tank at least 3 times with treated water.
B. Mixing of treated water with untreated water already in the tank	<ol style="list-style-type: none"> 1. Make sure that the tank used for sampling is empty of untreated water. 2. Flush the sampling tank at least 3 times with treated water.
Mixing of treated water with untreated water in pipe	
A. Open Ballast pump sea chest suction line	Make sure that sea chest suction line valve is closed and is not leaking.
B. Leaking isolation ballast water line valves	<ol style="list-style-type: none"> 1. Use different ballast tank if such avoids the leaking valve. 2. Replace the leaking valve.
Sample contamination	
A. During sampling	<ol style="list-style-type: none"> 1. Make sure that sampling is held by authorised and trained personnel. 2. The laboratory should follow specific and approved (Administration, Class) testing protocol. 3. The lab used should be certified and approved for such work.
B. During transportation	<ol style="list-style-type: none"> 1. Make sure that the laboratory follows a strict chain of custody form. 2. The laboratory should follow specific and approved (Administration, Class) testing protocol. 3. The lab used should be certified and approved for such work.
C. At the laboratory	<ol style="list-style-type: none"> 1. Make sure that the laboratory follows a strict chain of custody form. 2. The laboratory should follow specific and approved (Administration, Class) testing protocol. 3. The lab used should be certified and approved for such work. 4. Laboratory should keep a back up sample for re- analysis.

If Commissioning Testing has not/cannot be completed...what next?

- Guidance in these scenarios is not stipulated by the IMO
- Each Administration can determine how to address
- BEMA strongly encourages clear guidance to be developed:
 - By Administrations currently requiring commissioning testing; and/or
 - Possibly by the IMO in time for entry into force (1 June 2022)

****In such circumstances it is strongly advised that the ship owner informs both the Class and Flag in order to determine the acceptable course of action as the ship cannot be issued the requisite International Ballast Water Management Certificate.**

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- Email the Association at Info@BWEMA.org
- Visit our website www.BWEMA.org
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