COURSE OVERVIEW HE1138
Technical Integrity & HSECES Management

Course Title
Technical Integrity & HSECES Management

Course Reference
HE1138

Course Duration/Credits
Five days/4.0 CEUs/40 PDHs

Course Date/Venue

Sessions	Date	Venue
1	January 07-11, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	March 03-07, 2024	Cheops Meeting Room, Radisson Blu Hotel, Istanbul Sisli, Turkey
3	June 03-07, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	November 03-07, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

The aim of the course is to give the participants a comprehensive understanding of the various aspects of technical, integrity and HSECES management in process plants. The course combines current industry practices with engineering methods and applicable codes and standards. The course will cover the development and implementation of facility technical integrity and HSECES; the scope and key elements of mechanical integrity, reliability and engineered safety in process plants; the causes and implications of industrial failures; the consequences of pressure and storage equipment failures in vessels, exchangers, heaters, storage tanks and piping; the codes, standards and specifications used in safety design and the integration of the operability and maintainability in design; the types and various applications used in engineering material and ensure that the guidelines in the selection methodology are being met; and the methodology and design considerations of piping system in pressure and mechanical integrity.

The course will also discuss the principles, guidelines and best practices in safeguarding systems and its safety systems key design considerations; investigating the various failures in piping, rotating equipment, pressure vessels, piping and boilers and its causes, reliability improvement and prevention; and the correct procedures involved in the inspection, testing, repair and monitoring of piping systems and equipment in refineries, petrochemical and process plants.

Participants of the course will be able to identify and assess hazards; risk analysis and HAZOP studies; the safety management plan using the various risk analysis processes; the principles of fitness-for-service and engineering critical assessment; bowtie method and describe swiss cheese diagram and loss causation; bowtie diagram and the elements in bowtie risk management; the barrier in based management, type of barriers and prevention and mitigation barriers in bowtie; review effective barriers guide and adapt risk management and review effective barriers guide and adapt risk management; the barrier integrity covering effective control, safety critical elements and safety critical tasks; the safety critical roles and review safety critical documents; the HSE critical equipment & systems and its performance standards for all identified HSECES; the HSE critical activities, availabilities, functionalities, testing, examinations and certifications; and audit HSECES verification and the quality performance standards; the hazardous activities versus critical activities; the risk control hierarchy, assess control effectiveness, identify weakest area and apply bowtie approach; the bowtie risk management and discuss the linkage of HSE-MS in bowtie risk management; and the benefits of bowtie and real application of bowtie risk management in industries.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Get certified as a *"Certified Facility Integrity Auditor"*
- Develop and implement a facility integrity and technical audits
- Apply the scope and key elements of technical integrity, engineered safety and HSECES management in process plants and find the causes and implications of industrial failures
- Estimate the consequences of pressure and storage equipment failures in vessels, exchangers, heaters, storage tanks and piping
- Implement the codes, standards and specifications used in safety design and integrate the operability and maintainability in design
- Determine the types and the various application used in engineering material and ensure that the guidelines in the selection methodology are being met
- Employ the methodology and design considerations of piping system in pressure and mechanical integrity
- Apply the principles, guidelines and best practices in safeguarding systems and discuss its safety systems key design considerations
- Investigate the various failures in piping, rotating equipment, pressure vessels, piping and boilers and be able to explain its causes, reliability improvement and prevention
- Apply the correct procedures involved in the inspection, testing, repair and monitoring of piping systems and equipment in refineries, petrochemical and process plants
- Identify and assess hazards and carryout risk analysis and HAZOP studies and integrate the safety management plan using the various risk analysis processes
- Implement the principles of fitness-for-service and engineering critical assessment including fracture mechanics, flaw characterization, stability, etc
- Carryout bowtie method and describe swiss cheese diagram and loss causation
- Illustrate bowtie diagram and recognize the elements in bowtie risk management

- Identify the barrier in based management, type of barriers and prevention and mitigation barriers in bowtie
- Review effective barriers guide and adapt risk management
- Discuss barrier integrity covering effective control, safety critical elements and safety critical tasks
- Describe safety critical roles and review safety critical documents
- Explain HSE critical equipment & systems and its performance standards for all identified HSECES
- Determine HSE critical activities, availabilities, functionalities, testing, examinations and certifications
- Audit HSECES verification and apply quality performance standards
- Differentiate hazardous activities versus critical activities
- Determine risk control hierarchy, assess control effectiveness, identify weakest area and apply bowtie approach
- Carryout bowtie risk management and discuss the linkage of HSE-MS in bowtie risk management
- Recognize the benefits of bowtie and real application of bowtie risk management in industries

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides a wide understanding and deeper appreciation of technician integrity and HSECES management for facility integrity engineers, inspection engineers, corrosion engineers, facility engineers, reliability engineers, design engineers, maintenance engineers, safety engineers, loss prevention engineers and those engaged in the development and implementation of mechanical integrity programs for critical process equipment.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Workshops & Work Presentations
30% Case Studies & Practical Exercises
20% Software, Simulators & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Certificate(s)

(1) Internationally recognized Wall Competency Certificates and Plastic Wallet Card Certificates will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Successful candidate will be certified as a "*Certified Facility Integrity Auditor".* Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample Certificates

The following are samples of the certificates that will be awarded to course participants:-

(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

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Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 28-Apr-16

HTME No. PAR21931

Participant Name: Aqil Al Ajmi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
FE890	Facility Integrity & Technical Audit	April 24-28, 2016	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 Standard.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking Continuing Education Units (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology is accredited by

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Certificate Accreditations

Certificates are accreditation by the following international accreditation organizations:

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **4.0 CEUs** (Continuing Education Units) or **40 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Raymond Tegman is a **Senior HSE Consultant** with extensive experience within the **Oil & Gas**, **Petrochemical** and **Refinery** industries. His broad expertise widely covers in the areas of **Rigging** Safety Rules, Machinery & Hydraulic **Lifting Equipment**, Handling **Hazardous Chemicals**, Spill Containment, **Fire** Protection, **Fire** Precautions, **Incidents & Accidents** Reporting, **HSEQ** Audits & Inspection, **HSEQ** Procedures, **Environmental** Awareness, **Waste** Management Monitoring, **Emergency Planning**, **Emergency** Management, **Working at Heights**, **Root Cause Analysis**, **HSE** Rules & Regulations, Process Safety Management (**PSM**), Process Hazard Analysis (**PHA**), Techniques, **HAZOP**, **HSE** Risk, **Pre-Start-up Safety** Reviews, **HSE Risk** Identification, Assessments & Audit, **HSE Risk** Assessment & Management Concepts, **HSE Management** Policy & Standards, **HSSE Emergency Response & Crisis Management** Operations, **Confined Space Entry**, **Quantitative Risk Assessment** (**QRA**), Hazardous Materials & Chemicals Handling, Safety Precaution & Response Action Plan, **Hazard & Risk** Assessment, Task Risk Assessment (**TRA**), **Incident Command**, **Accident & Incident Investigation**, **Emergency Response Procedures**, Job Safety Analysis (**JSA**), Behavioural Based Safety (**BBS**), **Fall Protection**, **Work Permit & First Aid**, Lock-out/Tag-out (**LOTO**), **Emergency Response**, **Construction** Supervision, **Scaffolding** Inspection, **HAZCHEM**, Manual Material Handling, **Road Traffic** Supervision, ISO 9001 and OHSAS 18001.

During his career life, Mr. Tegman has gained his practical and field experience through his various significant positions and dedication as the **Operations Manager**, **Safety & Maintenance Manager**, **Safety Manager**, **Road/Traffic Supervisor**, **Assessor/Moderator**, **Safety Consultant**, **Safety Advisor**, **Safety Officer** and **Liaison Officer** from Zero Harm, SHRA Training & Services (Health & Safety), Road Crete, Balwin Property Development, DEME International, Gladstone Australia, Godavari Gas Pipeline and New Castle NCIG.

Course Fee

Dubai	**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 - 0830	***PRE-TEST***
0830 – 0930	***Overview of Technical Integrity*** *Definition, Spcope, & Key Elements-Hardware & Software Issues, Peopleware-Sound People Management • Potential Threats to Technical Integrity in a Hazardous Environment • Regulatory Requirements–SH&E, OSHA, SEVESO II • Life Cycle Implications–Design/ Operation/Maintenance, Regulatory/Industrial Interface, Training/Staff Development, Networking*
0930 - 1030	***Industrial Failures–Catastrophic Failures Do Happen*** *Statistics • Typical Examples • Causes & Implications • Learning*
1030 - 1045	*Break*
1045 - 1100	***Estimation of Consequences of Pressure & Storage Equipment Failures – Vessels, Exchangers, Heaters, Storage Tanks, & Piping*** *Types of Hazards – Release of Hazardous Substances, Bleves, Fractures, Explosions, Vapor Cloud Explosions • Guidelines & Procedures for Quantifying Consequences*
1100 - 1130	***Safety in Design I*** *Project Development & Design Bases • Appropriate Codes, Standards, Specifications, Industrial Practices • Safeguarding Premises • Calculation Methods, Heuristics*
1130 - 1200	***Safety in Design II*** *Quality Control in Design • Inherent Safety • Reliability & Availability Premises*
1200 - 1300	*Lunch*
1300 - 1330	***Integration of Operability & Maintainability in Design*** *Health, Safety & Environmental Considerations • Roles & Responsibilities of Engineering/Operation/Maintenance • Operating Strategies – Run Length, Shifts • Startup, Shutdown, Emergency Operating Procedures • Steam-Out & Flushing Procedures • Isolation, Blanking, Vents & Drains • Human Factor: Training Modules, Operator Training*
1330 - 1400	***Workshop I–Failure Consequences*** *Case Studies & Worked Examples*
1400 - 1415	*Break*
1415 - 1530	***Design Codes, Standards, Specifications, & Best Practices*** *Fit-For-Purpose Facilities • Business-Focused Facilities • Liability & Due Diligence*
1530 - 1600	***Engineering Materials I*** *Types & Application • Imperfections & Defects • Specifications & Standards*
1600 - 1650	***Engineering Materials II*** *Behaviour of Metals Under Stress • Degradation Processes • Selection Methodology & Guidelines*
1650 - 1700	***Recap***
1700	*Lunch & End of Day One*

Day 2

0730 - 0830	***Design of Major Plant Equipment–Methodology & Key Considerations*** *Pressure Vessels • Heat Exchangers • Fired Heaters & Boilers*
0830 - 0930	***Design of Piping Systems I–Pressure Integrity*** *Methodology & Key Considerations*
0930 - 1030	***Design of Piping Systems II–Mechanical Integrity*** *Special Design Considerations–Dynamic & Transients Loadings • Piping Flexibility & Supports*
1030 - 1045	*Break*
1045 - 1130	***Workshop II–Failures Due to Design Deficiencies*** *Case Studies*
1130 - 1200	***Safeguarding Systems I-Guidelines & Best Practices*** *Principles • Guidelines & Best Practices • Documentation • Safeguarding Systems Integrity–Design*
1200 - 1300	*Lunch*
1300 - 1330	***Safeguarding Systems II–Safety Systems Key Design Considerations*** *Safeguarding Safety Systems–SIL • Relief & Depressuring Systems • Safeguarding Systems Integrity & Effectiveness*
1330 - 1400	***Failures In Piping & Equipment Pressure Vessels, Piping & Boilers*** *Degradation Processes • Failures in Pressure Equipment • Piping System Vibration & Failure*
1400 - 1415	*Break*
1415 - 1600	***Failures In Rotating Equipment*** *Causes • Monitoring & Analysis • Reliability Improvement*
1600 - 1650	***Failure Prevention*** *FMEA • Causal Analysis*
1650 - 1700	***Recap***
1700	*End of Day Two*

Day 3

0730 - 0830	***Testing & Monitoring*** *NDT Methods • Inspection, Testing & Repair Regulations, Codes, & Practices • Evaluation of Inspection Data*
0830 - 0930	***Workshop III–Failures Due to Improper Operation & Maintenance*** *Case Studies*
0930 - 1030	***Hazard Identification & Assessment***
1030 - 1045	*Break*
1045 - 1130	***Risk Analysis, Assessment & Management*** *Probability Basics • Probabilistic Risk Assessment Concepts & Methodology • Fault Tree & Event Tree Analysis • Quantitative Risk Assessment Concepts & Methodology*
1130 - 1200	***Integrated Safety Management Plan*** *Hazard & Effect Management Plan • Bow-Tie Process • Risk Matrix • Determining Acceptability of Risk*
1200 - 1300	*Lunch*
1300 - 1330	***Hazard & Operability (HAZOP) Reviews*** *Process & Guidelines*
1330 - 1400	***Management of Change*** *Change Control Policy & Procedures • Process Changes • Plant Changes • Assessment & Authorization • Documentation • Illustrative Change Control Procedure*

1400 - 1415	*Break*
1415- 1530	***Workshop IV*** *Case Studies - Failures Due to Improper Management of Change System • Examples of HAZOP Reviews*
1530 - 1650	***Fitness-For-Service/Engineering Critical Assessments*** *API RP 579 Fitness-For-Service • Fracture Mechanics & Mode of Failure of Material • Flaw Characterization, Growth, Stability • Factors of Safety • Disposition versus Repair*
1650 - 1700	***Recap***
1700	*End of Day Three*

Day 4

0730 - 0900	***The Bowtie Method*** *Swiss Cheese Diagram & Loss Causation • Introduction to Bowtie Diagram*
0900 - 1030	***The Bowtie Method (cont'd)*** *Understanding Elements in Bowtie Risk Management*
1030 - 1045	*Break*
1045 - 1130	***Barrier in Bowtie Diagram*** *Barrier in Based Management • Type of Barriers*
1130 - 1200	***Barrier in Bowtie Diagram (cont'd)*** *Prevention & Mitigation Barriers in Bowtie • Effective Barriers Guide • Barriers in Bowtie: Adapting Risk Management*
1200 - 1300	*Lunch*
1300 - 1330	***Barrier Integrity*** *Effective Control • Safety Critical Elements • Safety Critical Tasks*
1330 - 1400	***Barrier Integrity (cont'd)*** *Safety Critical Roles • Safety Critical Documents*
1400 - 1415	*Break*
1415 - 1530	***HSECES*** *HSE Critical Equipment & Systems • HSECES Performance Standards for All Identified HSECES*
1530 - 1650	***HSECES (cont'd)*** *HSE Critical Activities, Availabilities, Functionalities, Testing, Examinations & Certifications • Audit for HSECES Verification • Quality Performance Standards*
1650 - 1700	***Recap***
1700	*End of Day Four*

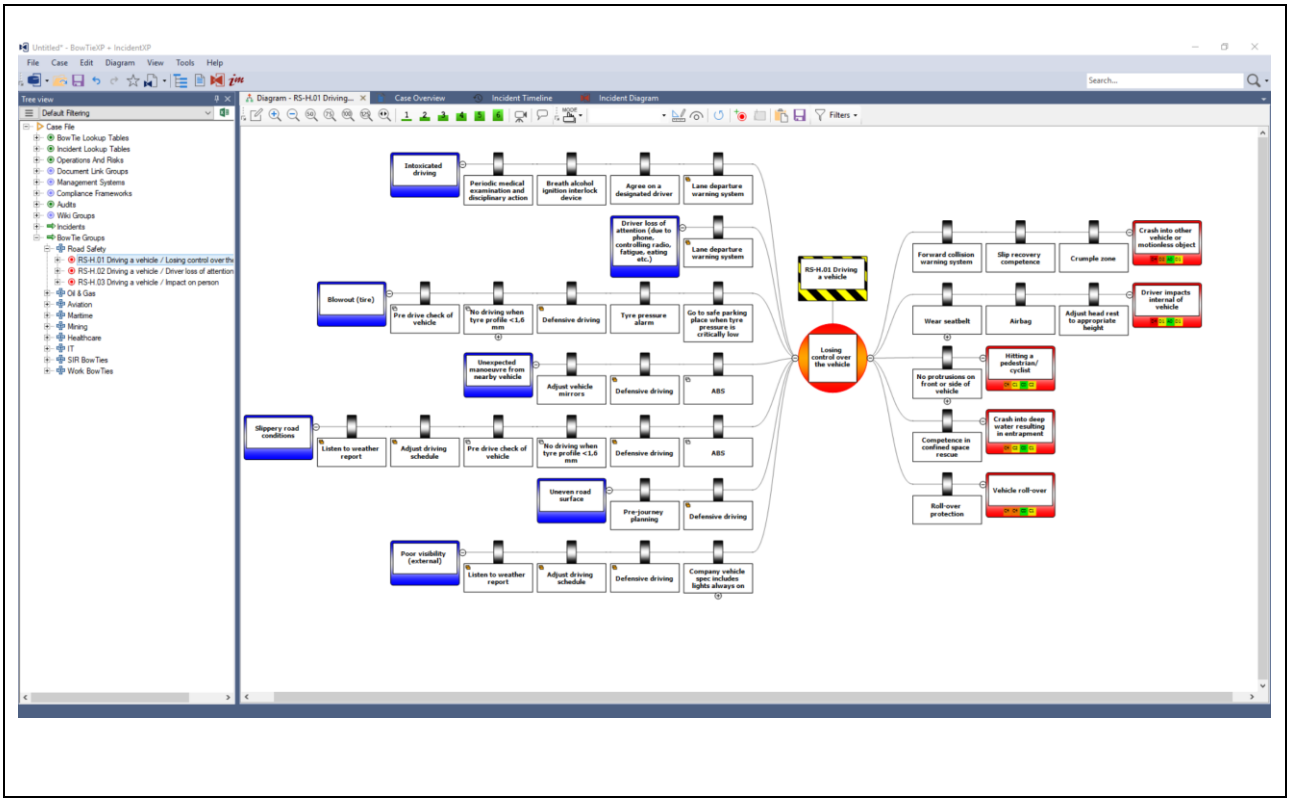
Day 5

0730 - 0830	***Hazardous Activities versus Critical Activities*** *Hazardous Activities • Critical Activities*
0830 - 0930	***Hazardous Activities versus Critical Activities (cont'd)*** *Example and Exercise on Hazardous and Critical Activities*
0930 - 1030	***Hands-On Exercise*** *Constructing Critical Activity Catalogue & Remedial Action Plan*
1030 - 1045	*Break*
1045 - 1130	***Hands-On Exercise (cont'd)*** *Example: Bowtie Exercise*
1130 - 1200	***Effectiveness versus ALARP*** *Risk Control Hierarchy • Assess Control Effectiveness*
1200 - 1300	*Lunch*

1300 - 1330	***Effectiveness versus ALARP (cont'd)*** *Identification of Weakest Area • ALARP: Bowtie Approach*
1330 - 1400	***Bowtie Risk Management*** *Linkage of HSE-MS in Bowtie Risk Management • Benefits of Bowtie*
1400 - 1415	*Break*
1415 - 1530	***Bowtie Risk Management (cont'd)*** *Real Application of Bowtie Risk Management in Industries*
1530 - 1545	***Course Conclusion***
1545 - 1645	***COMPETENCY EXAM***
1645 - 1700	*Presentation of Course Certificates*
1700	*End of Course*

Simulator (Hands-on Practical Sessions)

Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator "Bowtie360 Software".



Course Coordinator

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