

OES 2023-03

September 2023

Suspect/Counterfeit and Fraudulent Fasteners in Assembled Items

Introduction

This Operating Experience Summary (OES) provides information about suspect/counterfeit and fraudulent fasteners¹. Recommendations and clarifications are provided to the DOE enterprise to prevent the use of suspect/counterfeit item (S/CI) related fasteners in assemblies.

Background

Between 2018 and 2023, fasteners were the top reported S/CI into the Occurrence Reporting and Processing System (ORPS). Reference *Figure 1* for ORPS reports. The most commonly cited fastener issue was a *missing manufacturing (MFG) headmark* (reference *Figure 2* and *Figure 3*).

Figure 1. Fasteners were the most reported item into ORPS for S/CI (FY 2018-2023)

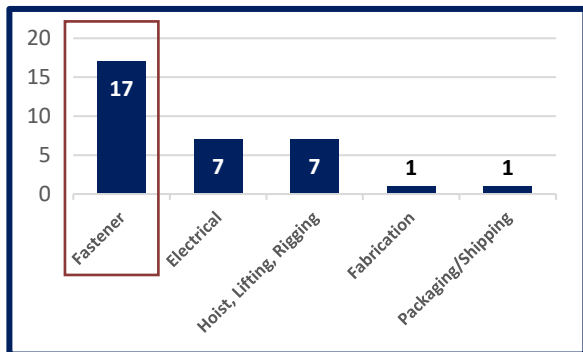


Figure 2. S/CI Fastener Issues reported into ORPS FY 2018 through FY 2023

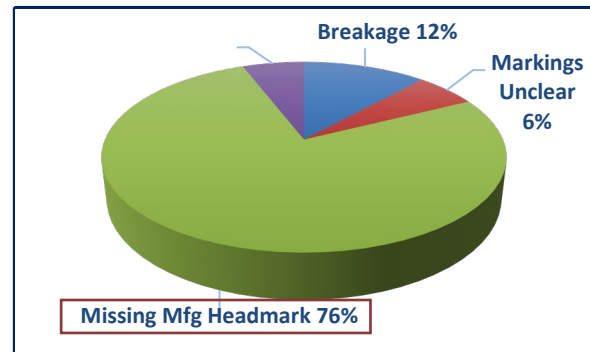
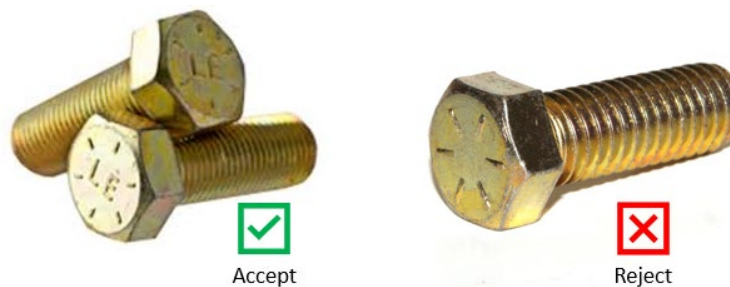


Figure 3. Example of Grade 8 fasteners with a manufacturer headmark (left) and missing a manufacturer headmark (right)



¹ Fasteners include metallic bolts, nuts, screws and studs or direct tension-indicating washers that are through-hardened (per the Fastener Quality Act).

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Discussion: Requirements

The following discussion elements answer questions on requirements for fasteners:

Question: Why do fasteners require a manufacturer marking?

Answer: The Fastener Quality Act² (FQA) is a law originally signed by President George H. W. Bush on November 16, 1990, but amended numerous times since then with the most current amendment being signed in 1999. The FQA requires that certain fasteners, sold in commerce, conform to the specifications to which they are represented to be manufactured. Many specifications require that a manufacturer marks the fastener with their identification mark if size permits (e.g., the fastener is above ¼" in diameter).

What does that mean?

In simple terms, a fastener needs to meet its own specification for marking. For instance, if you ordered a grade 5 bolt to the Society of Automotive Engineers (SAE) specification J429 it would be required to have a manufacturer identification marking if it is ¼" or larger.

Question: Are there requirements for reporting S/CI fasteners?

Answer: Yes, there are several requirements that relate to Fraudulent, S/CI, and Nonconforming reporting, which may also include the reporting of fasteners that meet criteria such as:

- (PL)101-592, *The Fastener Quality Act (FQA)*;
- DOE O 210.2A, *DOE Corporate Operating Experience Program*;
- DOE O 221.1B, *Reporting Fraud, Waste and Abuse to the Office of Inspector General*;

- DOE O 232.2A, *Occurrence Reporting and Processing of Operations Information*;
- DOE O 414.1 (Current), *Quality Assurance, and*
- FAR 52.246-26, *Reporting Nonconforming Items*.

Each requirement listed has different reporting criteria including exclusions. In addition, it is important to verify contractual requirements, local processes and procedures, and any local reporting requirements. Many organizations throughout the DOE have a point of contact assigned to perform specific reporting and communications.

Reference Attachment, *Example Process 1* for an example reporting process that may be used.

For questions on reporting requirements, please contact counterfeit@hq.doe.gov.

Question: What are some of the major differences between the law such as the FQA and DOE requirements?

Answer: Some items under the FQA are considered "fraudulent" and do not require much analysis if they meet this criterion. DOE requirements, however, also cover the intent of the FQA and it is important to understand the potential distinction of types of items that you may have. Due to the requirements of both the FQA and the DOE, there are various ways that a fastener may be classified:

- 1) Fraudulent³ per the FQA;
- 2) S/CI⁴ or fraudulent through analysis and per DOE requirements;

² The Fastener Quality Act (FQA), Public Law (PL) 101-592

³ Fraudulent Items are those that are intentionally misrepresented with intent to deceive, including items provided with incorrect identification or falsified and/or inaccurate certification.

⁴ Suspect Items are when there is an indication or suspicion that they may not be genuine and Counterfeit Items are intentionally manufactured, refurbished, or altered to imitate original products without authorization in order to be passed off as genuine.

- 3) Nonconforming⁵; or
- 4) Genuine⁶.

These are further explained in the following sections numbered 1-4.

1. *Fraudulent per the FQA*

Some fasteners are automatically considered fraudulent without further testing if they meet the criteria of the FQA. Generally, the following fasteners meet the FQA criteria:

- Fasteners that have nominal diameter of 6 millimeters/0.25 inch or greater; or
- Fasteners manufactured to standards and specifications of consensus standards organizations or government agencies that require a grade mark.

The FQA ***excludes*** fasteners that are:

- part of an assembly;
- that are ordered for use as a spare, substitute, service, or replacement part unless that part is in a package containing more than 75;
- contained in an assembly kit produced and marked as ASTM A 307 Grade A;
- produced in accordance with the ASTM F 432 standard;
- specifically manufactured for an aircraft if the quality is approved by the Federal Aviation Administration or by a foreign airworthiness authority;
- manufactured in accordance with the International Organization for Standardization (ISO); or other fastener quality assurance system defined by law; or
- manufactured to a proprietary standard.

2. *S/CI or fraudulent through analysis and per DOE requirements*

Fasteners may also be determined to be S/CI or fraudulent through analysis (not automatically considered fraudulent) and per DOE requirements. This may be completed through:

- Visual Inspection.
- Dimensional inspection.

⁵ Nonconforming Items are those with a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate.

- Tests/Evaluations (e.g., chemical, mechanical, nondestructive testing, etc.).
- Review of certifications and tests performed by manufacturers or third parties.

Note: The above is not a fully comprehensive list.

Fasteners may not fall under the FQA requirements for countless reasons including the fastener is a part of an assembly. If the item is not FQA related, then it is not automatically considered fraudulent, but may still be S/CI or nonconforming under DOE or other requirements such as the Federal Acquisition Regulation (FAR), which may be contractually required for some DOE contractors.

3. *Nonconforming*

Fasteners may be identified as nonconforming or defective. Analysis or information may support a determination that the fastener is ***not*** S/CI or fraudulent due to:

- Incorrect or inadequate information communicated to the supplier/manufacturer;
- Inadequate quality control processes (e.g., the manufacturer is issuing a recall because a lot/heat of defective fasteners escaped through quality processes);
- Damage during shipping, handling, or storage;
- Improper installation or use (e.g., there are specific torquing processes that were not followed, and bolts were stripped, stretched, or broke); or
- Misapplication (e.g., the wrong type of bolt or nut was chosen for the design that was inadequate for the application).

4. *Genuine*

Fasteners may be determined to be genuine after analysis. This could mean that verification was performed with a manufacturer, testing was conducted such as mechanical and chemical analysis, and/or documentation was reviewed and found to be within the limits of the specification or requirements that were given.

⁶ Genuine items are produced and certified without the intent to deceive.

Discussion: Detection

The following discussion elements answer questions on how to detect suspect/counterfeit fasteners through inspection and testing.

Question: When should I inspect fasteners?

Answer: Organizations should have a documented graded approach or risk-based approach to meet requirements such as inspections per DOE 414.1 (current), *Quality Assurance*. An inspection graded approach could range from informal and undocumented to very formalized documented processes performed in accordance with national consensus standards. Often the graded approach will depend on the use of the item such as fasteners that may be used in critical or safety related applications.

Even the term *critical* can be defined a variety of ways throughout the DOE. Critical could signify that the fastener will be used in a major functional area of a project and, if it fails, could result in the failure of that project or mission. A critical fastener may also represent a significant impact to health and safety of personnel or the public.

Although critical may be defined differently throughout the DOE, it is required that a more formalized approach to inspection is performed on high-strength fasteners used in safety applications⁷ and this inspection must also include an evaluation for potential S/CI.

Question: How do I know if a fastener is S/CI or fraudulent? What are some indicators?

Answer: During an inspection, it is possible that an inspector may identify potential indicators of S/CI. Indicators of S/CI fasteners include but are not limited to the following:

- Fastener is missing a manufacturer or grade mark (unless certified to a specification not requiring marking).
- Missing markings on nuts or washers packaged with labels indicating that they were manufactured to a consensus standard or military specification.

- Head markings are marred, missing, or appear to have been altered.
- Head markings are inconsistent with a heat and/or lot number or contain conflicting information.
- Headmarks with raised marks and depressed marks on same fastener (not normal manufacturing process).
- Stamping contains metric and standard measurements or double stamping.
- Evidence of machining marks.
- Poor thread form, evidence of wear, or threads are not of uniform color or finish.
- Coating/plating is incorrect or poor quality.

Previous Operating Experience Products

Previous Operating Experience Products from DOE Headquarters May 2017 to May 2023:

The following documents are publicly available at <https://www.energy.gov/>:

- *Suspect Counterfeit & Defective Fastener Inspection* ([link](#))⁸.
 - Document date: May 2022.
 - This guidance document replaces the previous “headmark list” that was used broadly throughout the DOE.
 - Document changes from previous headmark list included:
 - Adds clarification to the FQA requirements;
 - Provides information on S/CI indicators;
 - Clarifies that additional fasteners may be discovered (not just those that are on the headmark list);
 - Incorporates legacy headmark list; and
 - Provides case study examples.
- Operating Experience Level 3 (OE-3), S/CI Alert: *Ratchet Strap Bolts* ([link](#))⁹

⁷ Safety applications are those whose failure could adversely affect the environment, safety, or health of the public or workers. This term includes safety systems in nuclear facilities (see 10 C.F.R. § 830.3).

⁸ Suspect Counterfeit & Defective Fastener Inspection (<https://www.energy.gov/ehss/articles/suspect-counterfeit-defective-fastener-inspection>)

⁹ OE-3 2017-03: S/CI Alert: Ratchet Strap Bolts (<https://www.energy.gov/ehss/articles/operating-experience-level-3-sci-alert-ratchet-strap-bolts>)

- Document date: July 2017.
- Recommendations:
 - Perform inspections of ratchet straps for signs of damage as well as S/CI indicators during receipt and prior to use.
 - Report S/CIs to the Office of Inspector General.

Note: Some of the recommendations in this OES product provide additional information and clarification to previously released information based on industry provided data, internal DOE trends, and newly revised guidance processes.

Previous Operating Experience Products from the DOE Community May 2017 to May 2023: (continued)

Note: Reports below are all contained in the DOE OPEXShare which requires login. For DOE Federal and contractor employees that do not have access to the DOE OPEXShare but would like a copy of the reports listed below, contact your local Operating Experience (OPEX) coordinator to request a copy of the report. For non-DOE Federal employees please contact counterfeit@hq.doe.gov for information and options in accessing the referenced reports:

- *Lessons Learned- Suspect counterfeit Bolts Discovered at Idaho Cleanup Project (ICP) Facilities* ([link](#)), ICP, 03/2023.
- *Do No Re-Use Straps Received with Deliveries From Off Site* ([link](#)), Lawrence Livermore National Security-LLNS, 02/2023.
- *Suspect/Counterfeit Ratchet Straps Received from an Approved Supplier* ([link](#)), LLNS, 11/2021.
- *Preventing Suspect Fasteners from Entering your Facility* ([link](#)), Mission Support Alliance (MSA) Hanford, 12/2018.
- *Suspect Bolt Modified by Manufacturer to Meet ASTM Requirements* ([link](#)), MSA Hanford, 04/2018.
- *Identified Suspect/Counterfeit Bolts on Ratchet Tie Downs* ([link](#)), East Tennessee Technology Park (ETTP) URS|CH2M Oak Ridge LLC (UCOR), 03/2018.
- *Suspect/Counterfeit Components Identified in Ratchet Tie Down Assemblies* ([link](#)),

Portsmouth Mission Alliance, LLC (PMA), 02/2018.

- *Preventing Use of Suspect/Counterfeit Bolt Fasteners in DOT Ratchet Type Tie Down Assemblies* ([link](#)), Energy Facility Contractors Group-EFCOG, 02/2018.
- *Identified Suspect/Counterfeit Bolts on Ratchet Tie Downs* ([link](#)), East Tennessee Technology Park (ETTP) URS|CH2M Oak Ridge LLC (UCOR), 01/2018.

Recommendations

Although there is allowability for broad variation in the implementation of the management of DOE S/CI Programs, there are methodologies that may be standardized and implemented to prevent the introduction of S/CI fasteners in assembled components.

Prevention methods may include the following:

- Use of reputable manufacturers. Reputable manufacturers typically will follow and use nationally recognized consensus standards.
 - Example: When procuring assembled components such as ratchet strap assemblies, reputable manufacturers would typically be those that are registered with Nationally Recognized Associations such as the Web Sling & Tie Down Association ([WSTDA](#)) and/or Commercial Vehicle Safety Alliance ([CVSA](#)). Manufacturers listed with these organizations perform testing of their items in accordance with standardized industry practices and procedures. It is important to also verify that items are then procured directly from manufacturers or their authorized distributors to aid in verifying that items received through the supply chain are from these manufacturers.
- Conduct assessments on suppliers that will be used and validate their processes meet industry standards. Assessments may be shared throughout the complex to reduce duplication. This could be working with the EFCOG Supply Chain Quality [Community of Practice](#) to share information.

- Add clauses to contracts that address the standards, requirements, and clarify expectations for purchasing assemblies with fasteners. Clauses should specifically address manufacturer markings on bolts that identify a grade (e.g., if the bolt is marked grade 5 it must also be marked with a manufacturer marking for the DOE to accept the item). Clauses may also include requests for certified material test reports (CMTRs), Certificates of Conformance (C of Cs), and other test documentation that may aid in traceability and acceptance of the items or fasteners. Traceability may be needed for mission critical items, especially if those items are not able to be procured directly from the manufacturer or their authorized distributors.

Fastener related S/CI or nonconformance reports may find additional efficiency by standardizing and documenting the following processes:

- Training:
 - S/CI training is now available to DOE Federal employees and contractors online in Learning Nucleus and can be requested by contacting counterfeit@hq.doe.gov.
- Planning (e.g., a defined graded approach).
- Detecting (Inspection & Testing):
 - Perform randomized testing (e.g., chemical, and mechanical analysis) may be conducted to determine if items received from manufacturers meet intended requirements.
- Handling (e.g., segregation, marking, tagging).
- Reporting.
- Dispositioning:
 - To reduce confusion in disposition processes, if S/CI fasteners are received and are dispositioned to be ***used as is***, the organization should permanently mark the fasteners to clearly identify to those who may use the fasteners that these items are acceptable. This may include etching, stamping, painting, etc. Additionally, it is recommended that documentation attesting to the acceptance process

and those who accepted the fasteners is also traceable and maintained as long as the fasteners are in use. Processes that are incorporated at the organization for the acceptance or use of these types of fasteners should be well documented and familiarized with those who will use them.

Question: What if I receive an assembly that has an unmarked bolt, what should I do?

Answer: Reference Attachment 1, *Example process*. If you receive an assembled item with a bolt that is required to have a grade marking (i.e., it is not a blank bolt and the bolt is required to be marked by specification), look at the item for additional indications of S/CI. Does the item have a label with the appropriate markings such as manufacturer, load limits (as applicable), and/or other required markings? Manufacturers may also differentiate their items by using specific colors or other indicators such as the example shown in Attachment 2, *How to read a Tie Down Strap*.

Use of the above recommendations will reduce instances of S/CIs entering the DOE supply chain and reduce confusion in reporting, disposition, and disposal of potentially genuine products.

Conclusion

The DOE enterprise may be able to create efficiencies by preventing S/CI fasteners in assembled items. This can be accomplished by using the recommendations included in this OES document.

References

- 10 Code of Federal Regulations (C.F.R.) 830, *Nuclear Safety Management*
- Commercial Vehicle Safety Alliance (CVSA) <https://www.cvsa.org/membership/transportation-industry/current-associate-members/>
- *Do No Re-Use Straps Received with Deliveries From Off Site*, Lawrence Livermore National Security-LLNS, 02/2023: <https://doeopexshare.doe.gov/lesson/38969>
- DOE-HDBK-1221-2016, *Suspect/Counterfeit Items Resource Handbook*

<https://www.standards.doe.gov/standards-documents/1200/1221-BHdbk-2016-CN1-2017>

- DOE O 210.2A, *DOE Corporate Operating Experience Program*
- DOE O 231.1B, *Environment, Safety and Health Reporting*
- DOE O 232.2A, *Occurrence Reporting and Processing of Operations Information*
- DOE O 414.1(current), *Quality Assurance*
- EFCOG Supply Chain Quality Community of Practice- https://efcog.org/safety-working-group/quality-assurance-subgroup/?drawer=Quality%20Assurance%20Subgroup*Supply%20Chain%20Quality*Documents
- FAR 52.246-26, *Reporting Nonconforming Items*
- *How to pick the right tie-down strap: How to read a Tie Down Strap*. Inside Logistics, December 17,2021. <https://www.insidelogistics.ca/features/how-to-pick-the-right-tie-down-strap/>
- *Identified Suspect/Counterfeit Bolts on Ratchet Tie Downs*, East Tennessee Technology Park (ETTP) URS|CH2M Oak Ridge LLC (UCOR), 01/2018: <https://doeopexshare.doe.gov/lesson/17099>
- *Identified Suspect/Counterfeit Bolts on Ratchet Tie Downs*, East Tennessee Technology Park (ETTP) URS|CH2M Oak Ridge LLC (UCOR), 03/2018: <https://doeopexshare.doe.gov/lesson/19197>
- *Lessons Learned- Suspect Counterfeit Bolts Discovered at Idaho Cleanup Project (ICP) Facilities*, ICP, 03/2023: <https://doeopexshare.doe.gov/lesson/39053>
- Operating Experience Level 3 (OE-3), S/CI Alert: Ratchet Strap Bolts: <https://www.energy.gov/ehss/articles/operating-experience-level-3-sci-alert-ratchet-strap-bolts>
- (PL)101-592, *The Fastener Quality Act (FQA)*
 - Link to original released in 1990: <https://www.congress.gov/101/statute/STATUTE-104/STATUTE-104-Pg2943.pdf>
 - Link to amendment PL 104-113 (1996): <https://www.govinfo.gov/content/pkg/PL>

[AW-104publ113/pdf/PLAW-104publ113.pdf](https://www.govinfo.gov/content/pkg/PLAW-104publ113/pdf/PLAW-104publ113.pdf)

- Link to amendment PL 105-234 (1998): <https://www.govinfo.gov/content/pkg/PLAW-105publ234/pdf/PLAW-105publ234.pdf>
- Link to amendment PL 106-34 (1999): <https://www.govinfo.gov/content/pkg/PLAW-106publ34/pdf/PLAW-106publ34.pdf>
- *Preventing Suspect Fasteners from Entering your Facility*, Mission Support Alliance (MSA) Hanford, 12/2018: <https://doeopexshare.doe.gov/lesson/24734>
- *Preventing Use of Suspect/Counterfeit Bolt Fasteners in DOT Ratchet Type Tie Down Assemblies*, Energy Facility Contractors Group-EFCOG, 02/2018: <https://doeopexshare.doe.gov/lesson/17158>
- *Suspect Bolt Modified by Manufacturer to Meet ASTM Requirements*, MSA Hanford, 04/2018: <https://doeopexshare.doe.gov/lesson/21292>
- *Suspect/Counterfeit Components Identified in Ratchet Tie Down Assemblies*, Portsmouth Mission Alliance, LLC (PMA), 02/2018: <https://doeopexshare.doe.gov/lesson/17149>
- *Suspect Counterfeit & Defective Fastener Inspection* (May 16, 2022) <https://www.energy.gov/ehss/articles/suspect-counterfeit-defective-fastener-inspection>
- *Suspect/Counterfeit Ratchet Straps Received from an Approved Supplier*, LLNS, 11/2021: <https://doeopexshare.doe.gov/lesson/37940>
- Web Sling & Tie Down Association (WSTDA) <https://wstda.com/search/custom.asp?id=6181>

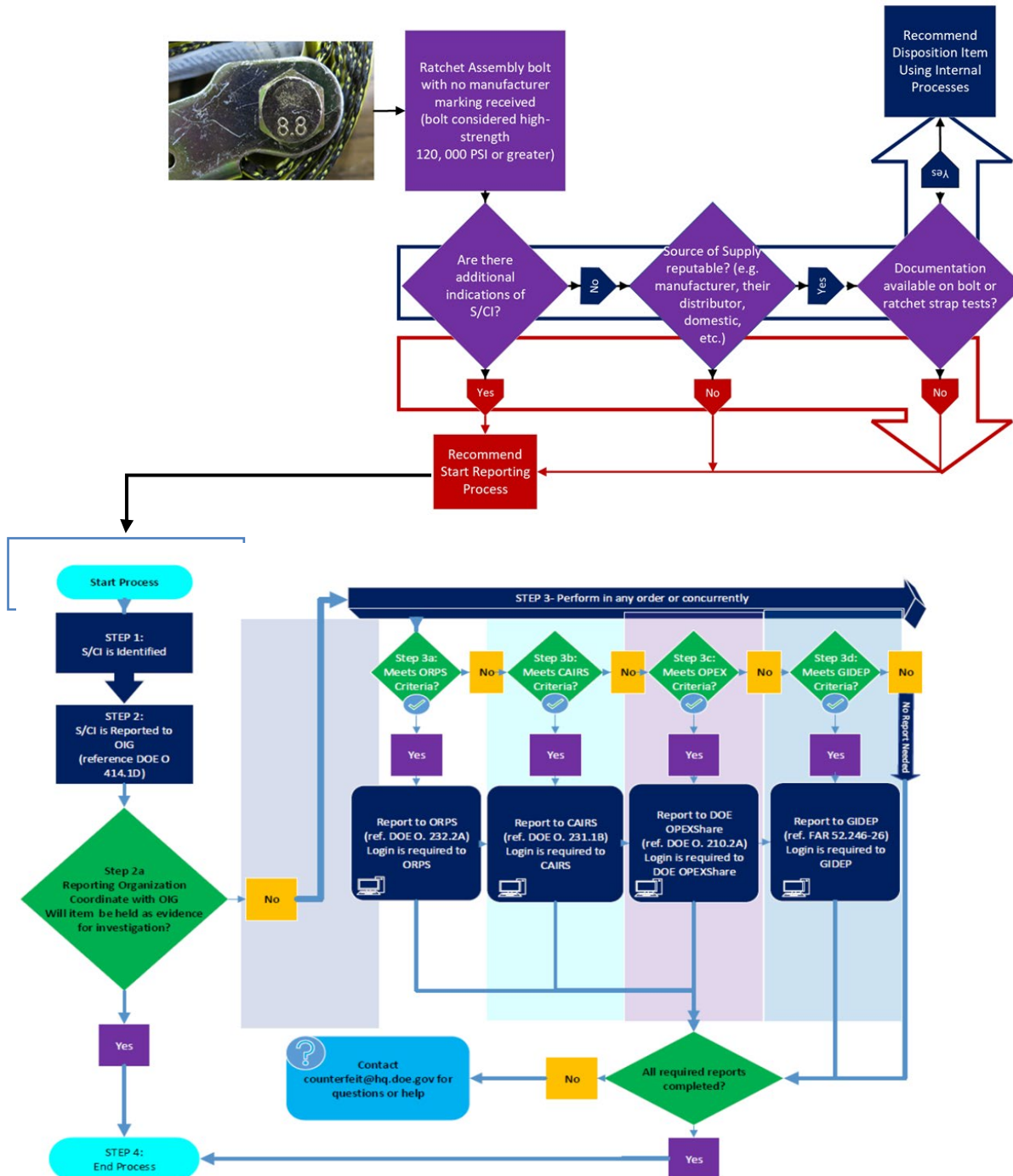
The Office of Environment, Health, Safety and Security, Office of ES&H Reporting and Analysis publishes OESs to promote safety throughout the DOE complex by encouraging the exchange of lessons learned information among DOE facilities.

For further information or assistance related to this OES, please contact Gabrielle Holcomb, S/CI Program Manager, at (240) 255-8299 or by email at gabrielle.holcomb@hq.doe.gov

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Attachment 1: Example Process



Attachment 1: Example Process Continued

Items identified as S/CI should be documented, reported, and controlled (e.g., marked, tagged, and/or segregated) in accordance with the requirements specified in DOE O 414.1 (current).

The reporting steps noted in the chart may be used, although some organizations may find that steps may be done concurrently, in a different order, or may include additional steps to meet organizational level requirements:

- 1) Suspect/Counterfeit Item is identified by organization.

NOTE 1: It is important to use internal processes before proceeding to next step. For instance, many organizations at the DOE (Federal and Contractors) have a designated S/CI Coordinator who manages much of the next reporting steps. There may also be various contacts such as DOE field/site office, contracting officer, legal, or other representatives—required to be notified prior to proceeding to the next steps.

- 2) Report item to the Office of Inspector General (email counterfeit@hq.doe.gov for S/CI reports). Go to the OIG Hotline form¹⁰ for anonymous reporting.

NOTE 2: The Office of Inspector General (OIG) may not respond within the 60-day Government-Industry Data Exchange Program (GIDEP) reporting time period required by FAR 52.246-26. Items should be considered “under investigation” per the exclusion listed in this FAR until a release is given to the reporting organization by the OIG or cognizant official. For questions, please contact counterfeit@hq.doe.gov prior to reporting to GIDEP in step 3 as noted below.

- 3) Determine other required reporting paths as noted below. Note that Step 3 can be done concurrently or in any order the reporting organization chooses:

3a. Does S/CI meet criteria in DOE O 232.2A, Occurrence Reporting and Processing of Operations Information? If yes, report to the DOE Occurrence Reporting and Processing System (ORPS) and continue to next question. If no, continue to next question.

3b. Does S/CI meet the criteria in DOE O 231.1B, Environment, Safety and Health Reporting? If yes, report any injuries or illness to Computerized Accident/Incident Reporting System (CAIRS) and continue to next question. If no, continue to next question.

3c. Does S/CI meet criteria in DOE O 210.2A, DOE Corporate Operating Experience Program? If yes, report to DOE OPEXShare and continue to next question. If no, continue to next question.

3d. Does S/CI meet the criteria in Federal Acquisition Requirement (FAR) 52.246-23, Reporting Nonconforming Items? If yes, report to the GIDEP. If no, continue to step 4.

- 4) End process.

¹⁰ OIG Hotline Form is at <https://www.energy.gov/ig/office-inspector-general>.

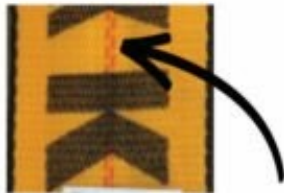
Attachment 2: How to read a Tie Down Strap.

< HOW TO READ A TIE-DOWN STRAP

Knowing how to read the information on a winch or ratchet strap, from the color to the lines down the middle, helps drivers protect their cargo, adhere to industry cargo securement regulations and keep other vehicles on the road safe.

1 Working Load Limit Tags

Legal strap tags have the working load limit marked in both pounds and kilograms. Some manufacturers also stencil the WLL right on the strap.



2 Breaking Strength

Straps include webbing strength information as established by the Web Sling Tie Down Association. Breaking strength equals three times the working load limit. A single red line represents 5,000 lbs. per inch. Double red lines represent 6,000 lbs. per inch.

3 Colored Straps

Kinedyne offers three main colors to differentiate its straps.*



Maximum WLL of 5,400 lbs./2,450 kgs.

Gray - RhinoMax™



Maximum WLL of 6,670 lbs./3,025 kgs.

Orange - K-Force™



Maximum WLL of 6,670 lbs./3,025 kgs.

*Customers should always ensure the WLL is clear, if the WLL is unclear the strap should be taken out of service