

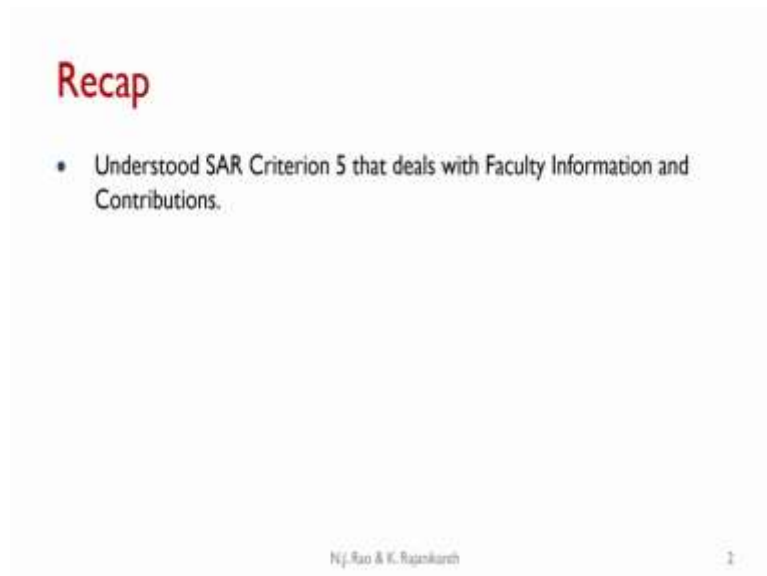
**NBA Accreditation and Teaching-Learning in Engineering
(NATE)
Professor K. Rajanikanth
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Indian Institute of Science, Bengaluru
Lecture 57**

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Greetings, welcome to module 3, unit 17 on Facilities and Technical Support.

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In the earlier unit, we understood SAR criterion 5 that deals with faculty information and contributions.

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M3 UI7: Outcome

- Understand the SAR requirements related to Facilities and Technical Support. (Criterion 6 of SAR)

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In this unit we look at criterion 6 of SAR. The outcome for this unit is understand the SAR requirements related to facilities and technical support.

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Criterion 6: Facilities and Technical Support

- Criterion 6 is concerned with laboratories to run the program-specific curriculum and technical support staff.
- The sub-criteria, the allocation of marks, and the required exhibits differ marginally between Tier I and Tier II institutes. However, the total marks are 80 in both the cases.

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Criterion 6 is concerned with laboratories to run the program specific curriculum and technical support staff. The sub criteria, the allocation of marks, and the required exhibits differ marginally between Tier 1 and Tier 2 Institute's. However, the total marks are 80 in both the cases, most of the exhibits required are quite similar for both Tier 1 and Tier 2 institutes. We will also see that several sub criteria are quite similar for both types of institute.

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Sub-Criteria and Allocation of Marks

Tier I Institute:

Sub-Criterion	Tier I
6.1 Adequate and well-equipped laboratories, and technical manpower	40
6.2 Laboratories: Maintenance and overall ambience	10
6.3 Safety measures in laboratories	10
6.4 Project laboratory/Facilities	20
TOTAL	80



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The sub criteria and allocation of marks for a Tier 1 Institute are as follows. There are 4 sub criteria and the total marks come to 80. The first sub criterion is adequate and well equipped laboratories and technical manpower, 40 marks. The second sub criterion is laboratories maintenance and overall ambience 10 marks. 6.3 is safety measures in laboratories again for 10 marks. 6.4 is project laboratory, project facilities for 20 marks, the total is 80 marks.

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Sub-Criteria and Allocation of Marks (2)

Tier II Institute:

Sub-Criterion	Tier II
6.1 Adequate and well-equipped laboratories, and technical manpower	30
6.2 Additional Facilities created for improving the quality of learning experience in Laboratories.	25
6.3 Laboratories: Maintenance and overall ambience	10
6.4 Project laboratory/Facilities	05
6.5 Safety measures in laboratories	10
TOTAL	80

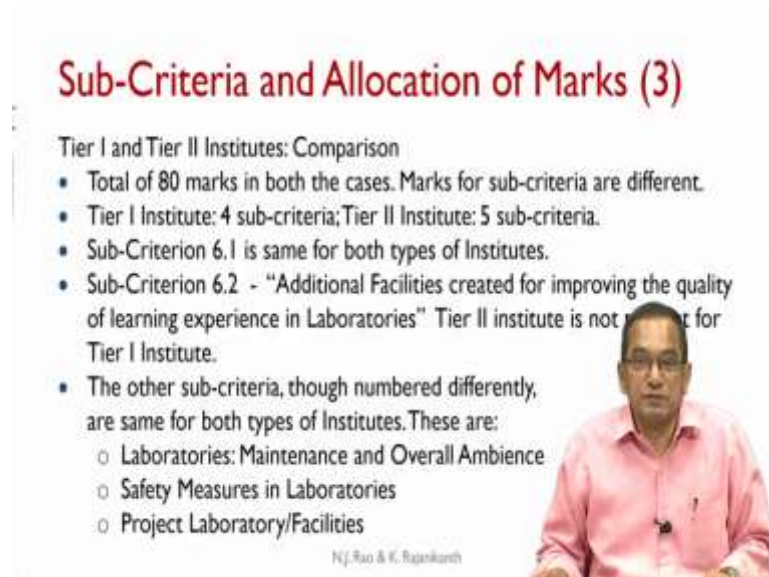


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For Tier 2 Institute there are 5 criteria. The first sub criterion deals with again adequate and well equipped laboratories and technical manpower but the marks of 30. 6.2 is additional facilities created for improving the quality of learning experience in laboratories, 25 marks. 6.3 is laboratories maintenance and overall ambience 10 marks. 6.4 project laboratory

facilities 5 marks. 6.5 is safety measures in laboratories for 10 marks. The total again comes to 80 marks.

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Sub-Criteria and Allocation of Marks (3)

Tier I and Tier II Institutes: Comparison

- Total of 80 marks in both the cases. Marks for sub-criteria are different.
- Tier I Institute: 4 sub-criteria; Tier II Institute: 5 sub-criteria.
- Sub-Criterion 6.1 is same for both types of Institutes.
- Sub-Criterion 6.2 - "Additional Facilities created for improving the quality of learning experience in Laboratories" Tier II institute is not present for Tier I Institute.
- The other sub-criteria, though numbered differently, are same for both types of Institutes. These are:
 - Laboratories: Maintenance and Overall Ambience
 - Safety Measures in Laboratories
 - Project Laboratory/Facilities

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Thus if we compare Tier 2 Institute with Tier 2 Institute for the sub criteria under 6.1, 6.2 6.3, 6.4 and 6.5 for Tier 2, we note that there are many similarities also. Total of 80 marks in both the cases. Marks for sub-criteria are different. Tier 1 Institute, 4 sub-criteria. Tier 2 institute 5 sub-criteria. Sub-Criterion 6.1 is same for both types of institutes.

The sub criterion 6.2 which is additional facilities created for improving the quality of learning experience in laboratories is only for Tier 2 Institute. It is not present for Tier 1 Institute does this criterion is unique for Tier 2 Institutes only.

The other sub criteria, though number differently are same for both types of institute, they are laboratories, maintenance and overall ambience, safety measures in laboratories, project laboratory and facilities.

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Sub-Criterion 6.1

Adequate and well-equipped laboratories, and technical manpower.

- Requirements are common to both Tier I and Tier II Institutes though evaluation guidelines and allocation of marks are different.
- Evaluation Guidelines for Tier I Institute:
 - A. Adequate well-equipped laboratories to run all the program-specific curriculum (25 Marks)
 - B. Availability of adequate and qualified technical supporting staff (15 Marks)

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So, let us look at sub criterion 6.1, which is adequate and well-equipped laboratories and technical manpower. Requirements are common to both Tier 1 and Tier 2 institutes though evaluation guidelines and allocation of marks are different. Evaluation guidelines for Tier 1 institute are adequate, well equipped laboratories to run all the program specific curriculum carries 25 marks. The second guideline is the availability of adequate and qualified technical supporting staff, this carries 15 marks.

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Sub-Criterion 6.1 (2)

- Evaluation Guidelines for Tier II Institute:
 - A. Adequate well-equipped laboratories to run all the program-specific curriculum (20 Marks)
 - B. Availability of adequate technical supporting staff (5 Marks)
 - C. Availability of qualified technical supporting staff (5 Marks)
- Guidelines B and C of Tier II Institute together appear as Guideline B of Tier I Institute!
- The data required is same in both cases and evaluation guidelines are effectively same.
The data provided is evaluated by the visiting team based on their perception.

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The evaluation guidelines for Tier 2 institute are 3 in number. The first one is same as for Tier 1 Institute, adequate well equipped laboratories to run all the program specific curriculum, marks are 20. The second guideline is the availability of adequate technical

supporting staff, marks are 5. The third guideline is the availability of qualified technical supporting staff again for 5 marks.

If you notice, the guidelines B and C of Tier 2 institute together appear as guideline B of Tier 1 institute. For a Tier 1 Institute, we say availability of adequate and qualified technical supporting staff. For a Tier 2 Institute, these two aspects are separated. The guideline B becomes adequate technical support and staff. Guideline C becomes qualified technical supporting staff, thus though the guidelines look different they are essentially the same.

The data required is same in both the cases and evaluation guidelines are effectively the same. The data provided is evaluated by the visiting team based on their subject to perception.


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Sub-Criterion 6.1 (3)

Data to be provided (for both Tier I and Tier II institute):

Sr. No.	Name of the Laboratory	No. of Students per Setup (Batch size)	Name of the Important Equipment	Weekly utilization status (all the courses for which the lab is utilized)	Technical Manpower Support		
					Name of the Technical Staff	Designation	Qualification
I.							
N.							

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Data to be provided for both Tier 1 and Tier 2 Institutes is given in the particular format as mentioned in the SAR, we state the laboratory, the number of students per set up batch, name of important equipment in the laboratory, weekly utilization status, all the courses for which the lab is utilized.

Then we state the technical manpower support, name of the technical staff, designation and qualification. These details need to be provided for all the labs concerned with the particular program for which accreditation is being sought.


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Sub-Criterion 6.1 (4)

Good Practices:

- A chart showing the utilization can be maintained in each lab.
- When the Lab is being shared by different departments:
 - Authority for allocation of Lab resources and Support Staff must be shown clearly.
 - It must be ensured that students of all the programs who are using the Lab are happy with the services provided in the Lab. (It may be necessary to get feedback from the students to ensure this)
 - Clear policy must be established for providing additional slots when required.

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Sub-criterion 6.1, will be evaluated better by the visiting team if the department can follow certain good practices a chart showing the utilization can be maintained in each lab. The schedule of different batches of students who come into this lab can be shown in the form of a chart. And this chart can be made available in the laboratory itself. When the lab is being shared by different departments, certain additional considerations come into picture.

Authority for allocation of lab resources and support staff must be shown clearly. It must be ensured that students of all the programs who are using the lab are happy with the services provided in the lab. The reason for this consideration is that sometimes students of one department are not happy with the kind of support that they get when they visit the lab belonging to another department. While all the labs are essentially, the facilities provided by the Institute.

In some cases, it does appear that the students do have some difficulties when they work in the laboratories belonging to other departments. The department must ensure that such an unfortunate scenario does not occur. It may be necessary to get feedback from the students to ensure this.

While the visiting team interacts with the students, they would certainly be asking the students if they are happy with the laboratory facilities available to them. So, we must ensure that students of all the programs who are using a particular laboratory are happy with the

services available in the laboratory. Clear policy must be established for providing additional slots when required.

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Additional Facilities Created for Improving the Quality of Learning Experience in Laboratories

- This sub-criterion is relevant for Tier II Institute only.
- It is listed as Sub-Criterion 6.2.
- Data to be provided:

Sr. No.	Faculty Name	Details	Reason(s) for Creating Facility	Utilization	Areas in which Students are expected to have enhanced learning	Relevance to POS and PSOs
I.						
N.						

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Then there is one sub criterion, which is unique to Tier 2 Institutes additional facilities created for improving the quality of learning experience in laboratories. This is listed as sub criterion 6.2 for Tier 2 institutes this upgrade area does not exist for Tier 1 institute. The department must provide the data as shown in the format, the name of the faculty, the details, reasons for creating the facility utilization, the area in which students are expected to have enhanced learning relevance to POS and PSOs.

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Additional Facilities Created for Improving the Quality of Learning Experience in Laboratories(2)

- Evaluation Guidelines:
 - A. Availability and relevance of additional facilities(10 Marks)
 - B. Utilization of facilities and effectiveness (10 Marks)
 - C. Relevance to POs and PSOs (5 Marks)
- Supporting documents must be available.
- Avoid listing routine equipment like Projectors as additional facilities!
- Impact analysis must be done. Actions must be taken based on such analysis. Supporting documents must be maintained.
- Records of sharing these facilities must be maintained, if relevant.

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The evaluation guidelines for this sub criterion are 3. Availability and relevance of additional facilities for 10 marks. Utilization of facilities and effectiveness 10 marks again. Relevance to POs and PSOs, 5 marks. Supporting documents must be available. The documents must clearly show what are the additional facilities established.

What are the motivations for establishing those additional facilities, which are the POS and PSOs that get related to these additional facilities and what is the extent to which these additional facilities are getting utilized.

Avoid listing routine equipments like projectors as additional facilities. We are talking of additional facilities for improving the quality of learning experience in the laboratories. It is a good practice to do impact analysis. Action must be taken based on such analysis and the department must maintain supporting documents. How do the students react to the additional facilities?

Are they happy with the quality of learning experiences that they get in these additional facilities? Do they find that the additional facilities are relevant to the POs and PSOs, we must get data about all these aspects, how the students pursue these additional facilities. Records of sharing these facilities must be maintained if relevant, if the additional facilities created in one department are being utilized by students of other programs also, then records must show such utilization also.

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Laboratories: Maintenance and Overall Ambience

- This is listed as Sub-Criterion 6.2 for Tier I Institute and as Sub-Criterion 6.3 for Tier II Institute.
- Evaluation is based on the perception of the Visiting Team when they inspect the facilities.
- Good Practices:
 - Implement preventive maintenance where required. Have policy documents and implementation records.
 - Calibrate the equipment where necessary. Have policy documents and implementation records.
 - Maintenance records must be up to date.
 - Implement the necessary inventory policies for components/materials.

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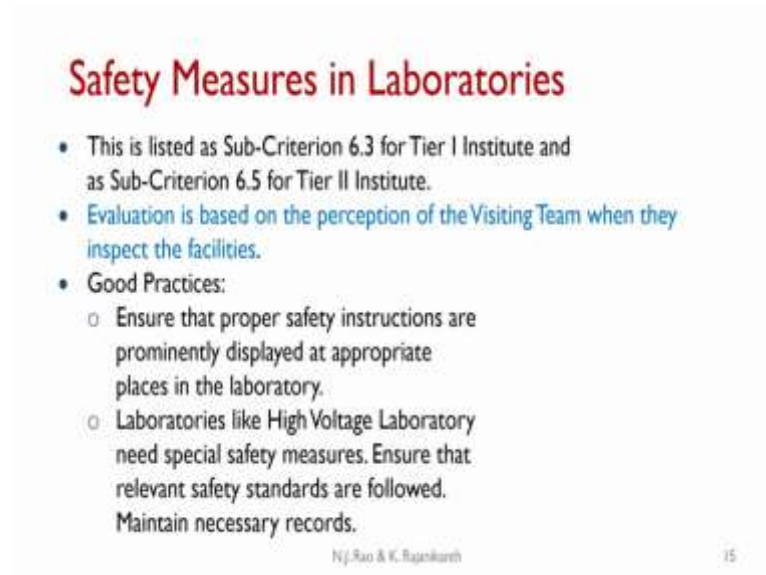
Then we come to the sub criterion, the maintenance and overall ambience in the laboratories. This is listed As sub criterion 6.2 for Tier 1 Institute, and as sub criterion 6.3 for Tier 2 Institute evaluation is based on the perception of the visiting team when they inspect the facilities. Again some good practices that a department can follow are provided here. Implement preventive maintenance where required.

Have policy documents and implementation records. Some of the equipments would need a preventive maintenance. So in such cases how an appropriate preventive maintenance schedule and demonstrate that you are implementing such a preventive maintenance schedule. Calibrate the equipment where necessary.

Periodic calibration of some equipments would be essential to ensure that the students are able to conduct the experiments effectively. In all such cases, ensure that calibration is done at appropriate times. Have documents indicating the policy for calibration, and also maintain records showing the implementation of such calibrations.

Maintenance records must be up to date. Implement the necessary inventory policies for the components and materials. Most of the institutes do maintain adequate stocks of components and materials and follow some methodology for replenishing components and materials. But these processes are most often quite informal. But it is a good practice to establish a methodical way of dealing with such issues and ensure that the established procedure is followed by the department.

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Safety Measures in Laboratories

- This is listed as Sub-Criterion 6.3 for Tier I Institute and as Sub-Criterion 6.5 for Tier II Institute.
- Evaluation is based on the perception of the Visiting Team when they inspect the facilities.
- Good Practices:
 - Ensure that proper safety instructions are prominently displayed at appropriate places in the laboratory.
 - Laboratories like High Voltage Laboratory need special safety measures. Ensure that relevant safety standards are followed. Maintain necessary records.

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Another Sub-Criterion is safety measures in laboratories. This is listed as sub criterion 6.3 for Tier 1 Institute and as sub criterion 6.5 for Tier 2 Institute, the sub criterion is same but it is numbered differently for Tier 1 Institute and Tier 2 Institute. Evaluation is based again on the perception of the visiting team when they inspect the facilities. Some good practices that can be followed are as follows.

Ensure that proper safety instructions are prominently displayed at appropriate places in the laboratory. Laboratories like high voltage laboratory need special safety measures. Ensure that relevant safety standards are followed. Maintained the necessary records, the records must show the standards which are relevant to that particular laboratory and the records must also show the implementation of all those standards.

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Safety Measures in Laboratories (2)

- Good Practices (continued):
 - Ensure proper maintenance of safety equipment like Fire Extinguishers. Have necessary records.
 - Ensure that proper standards are followed while handling / storing hazardous chemicals, explosive substances etc.
 - Ensure that First-Aid Kits are in proper condition.
 - Have a Standard Operating Procedure for emergencies.
- Based on specific local context, implement any other safety measures in the laboratories as required.



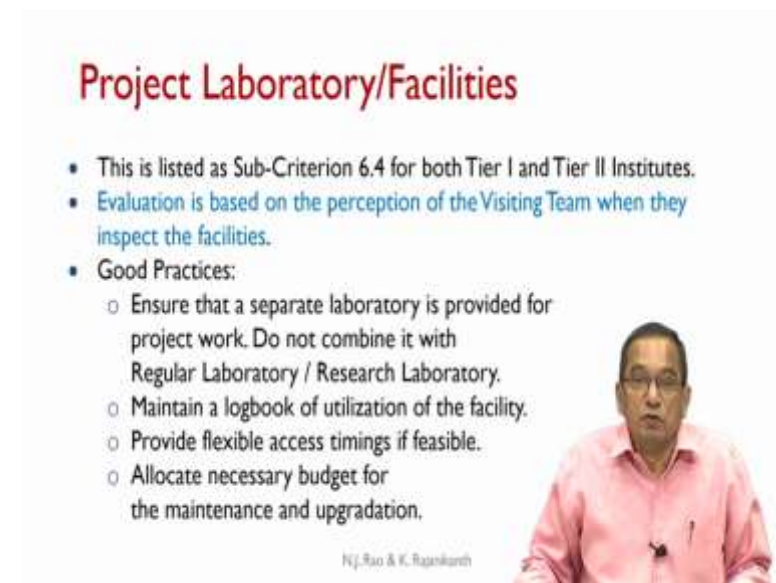
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Ensure proper maintenance of safety equipment like fire extinguishers, have necessary records. Ensure that proper standards are followed while handling or storing hazardous chemicals, explosive substances etc. Ensure that first aid kits are in proper condition. These look like very trivial aspects of the laboratory safety measures.

But often, departments tend to forget these small matters only. It is important that all the safety measures are properly implemented in all the laboratories. Have a standard operating procedure for emergencies. Based on specific local context, implement any other safety measures in the laboratories as required.

There can be many other safety measures which are required in a specific context. The institute must analyze these requirements carefully and implement appropriate safety measures.


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Project Laboratory/Facilities

- This is listed as Sub-Criterion 6.4 for both Tier I and Tier II Institutes.
- Evaluation is based on the perception of the Visiting Team when they inspect the facilities.
- Good Practices:
 - Ensure that a separate laboratory is provided for project work. Do not combine it with Regular Laboratory / Research Laboratory.
 - Maintain a logbook of utilization of the facility.
 - Provide flexible access timings if feasible.
 - Allocate necessary budget for the maintenance and upgradation.

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Project laboratory facilities, this is listed as sub criterion 6.4 for both Tier 1 and Tier 2 institutes, again evaluation is based on the perception of the visiting team when they inspect the facilities. Some of the possible good practices are as follows. Ensure that a separate laboratory is provided for project work. Do not combine it with any regular laboratory or any special laboratory like a research laboratory.

Let the laboratory for project work be a dedicated one. Provide a separate laboratory even if it is small, dedicated to project work only. Maintain logbook of utilization of the facility, if it is feasible, provide flexible access timings. If the students can work beyond the schedule college hours, make it possible for them to work in the project laboratory. The access controls for the project laboratory should be more liberal when compared with the access controls for regular laboratories.

The motivation for this is that the students must be able to work in the project laboratory beyond the scheduled college timings. Allocate necessary budget for the maintenance and upgradation of the project laboratory. The project laboratory may not be treated as on par with other regular laboratories required for the program curriculum. The project laboratory is generally a unique additional facility created to help the students practice the project ideas in a more conducive environment.

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M3 U18

- Understand the SAR requirements related to Continuous Improvement.
(Criterion 7 of SAR)

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In the next unit we will understand the SAR requirements related to continuous improvement. That is criterion 7 of SAR. Thank you.