

# NOCS Development Report

(Metal and Electrical sectors)

1. Machinery Fitter Level 4
2. Machine Tool Operator Level 4
3. Building Automation Technician Level 4
4. Mechatronics Technician Level 4



Supported by



Submitted by

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## Background of the mission

The development of the occupational standards is part of a longer-term support of the NSSA for the systematic development of professional standards in the field of electrical engineering and metal technology.

The experts have been involved at an earlier stage in the introduction of corresponding methods at lower qualification levels (L1 to L3).

## Objectives of the mission

The mission contributes to the work package D of the overall assignment:

- ➔ Support MOLIP/NSSA in strengthening institutional capacities and quality management for skills development, assessment and certification for Myanmar work force
- ➔ In particular Work Package D2, the development of two technical occupational standards to be used in TVET.

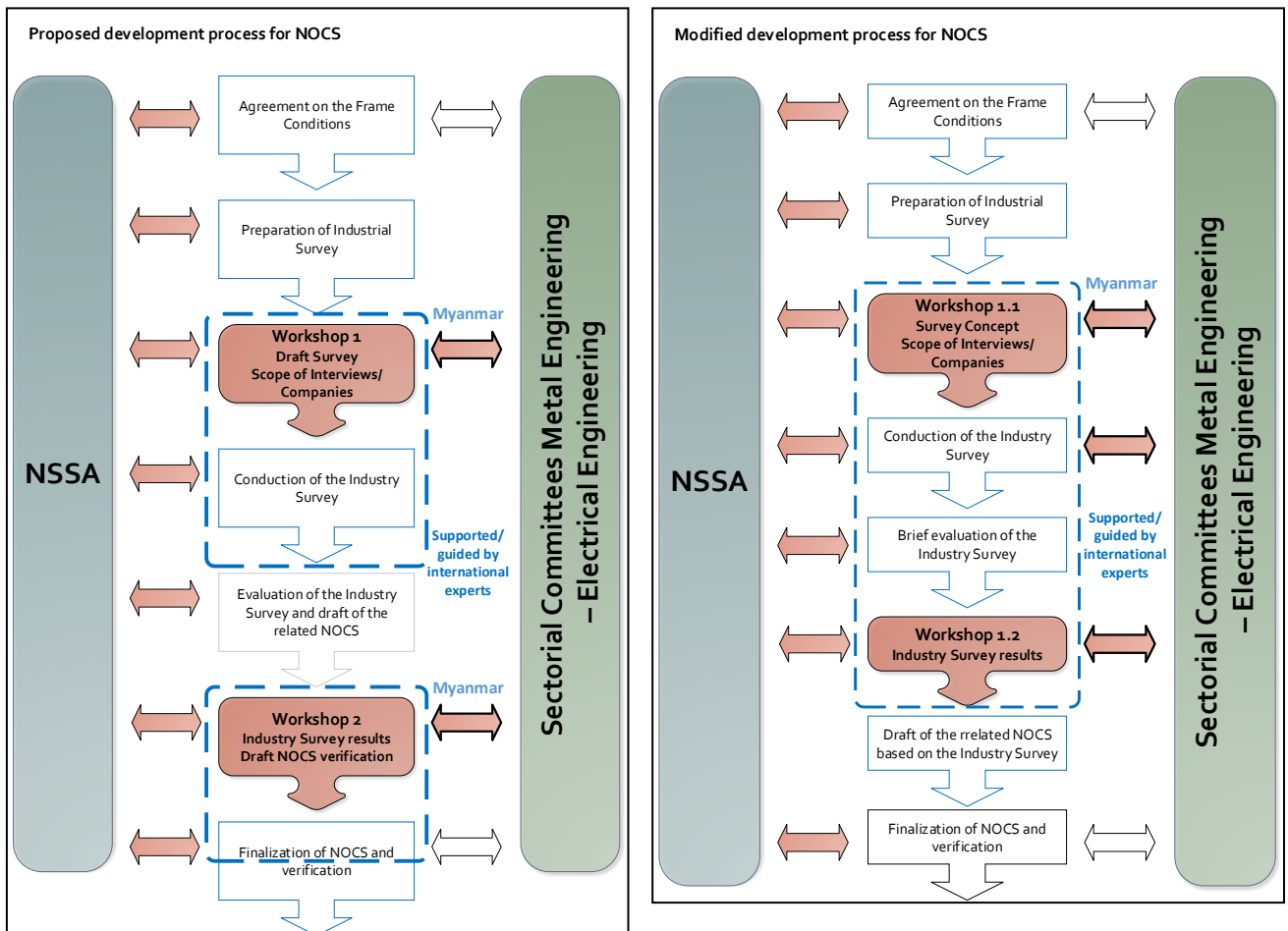
It was agreed with NSSA to extend the deliverables to four occupational standards (two for each occupational area metal mechanics and electrics – mechatronics) as a special case and to complete the occupational maps as per long term planning.

The titles and levels of the occupational standards were already defined and agreed at previous missions:

- ➔ Machinery Fitter Level 4
- ➔ Machine Tool Operator Level 4
- ➔ Building Automation Technician Level 4
- ➔ Mechatronics Technician Level 4

## Implementation

Due to circumstances beyond the control of the consultants, the implementation strategy could not be implemented as indicated in the offer. The second mission of the experts to Myanmar to discuss in depth the results of the industry survey and the deriving implications for the envisaged NOCS could not be realized. This includes also the process of validation of the NOCS, which was partly to be accompanied by the international experts.



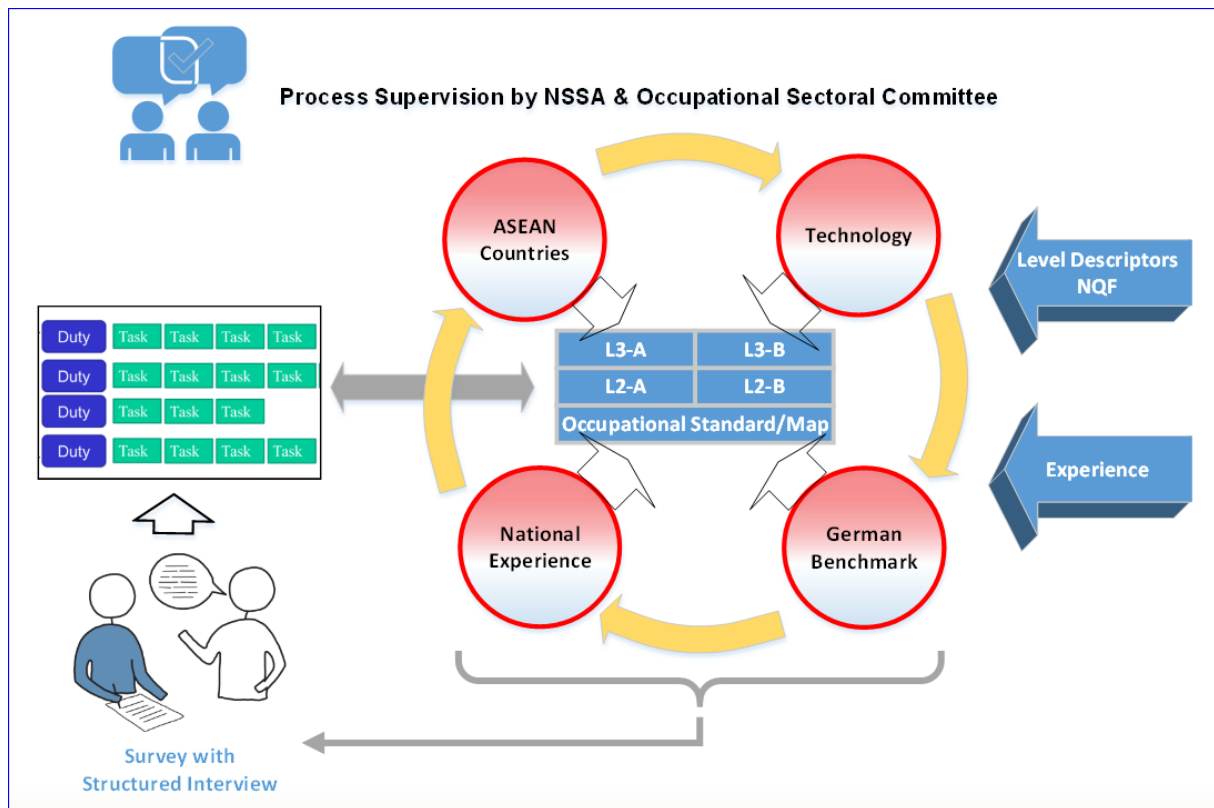
## Activities and methodology

To accomplish the assignment, the international experts elaborated with NSSA and the sectorial committees the frame conditions for NOCS development in Myanmar.

- Identification of occupations
- Sector-specific or cross-sectoral consideration of the occupational profiles
- Classification of the selected occupations according to international or national classification guidelines
- Level of qualification including level descriptors

Based on the frame conditions and the reference system, the first drafts of the related industrial surveys were developed. In a first workshop, representatives of NSSA and the responsible sectorial committees discussed and modified the survey concept, the scope of the questionnaire and the companies for consideration.

## Occupational standard reference system



The development process should consider actual trends of the Myanmar economy and the progress of the associated technologies on national, regional and international level. This applies in particular to the metal and electrical engineering sectors, which are exposed to major technological changes globally and thus also increasingly in Myanmar.

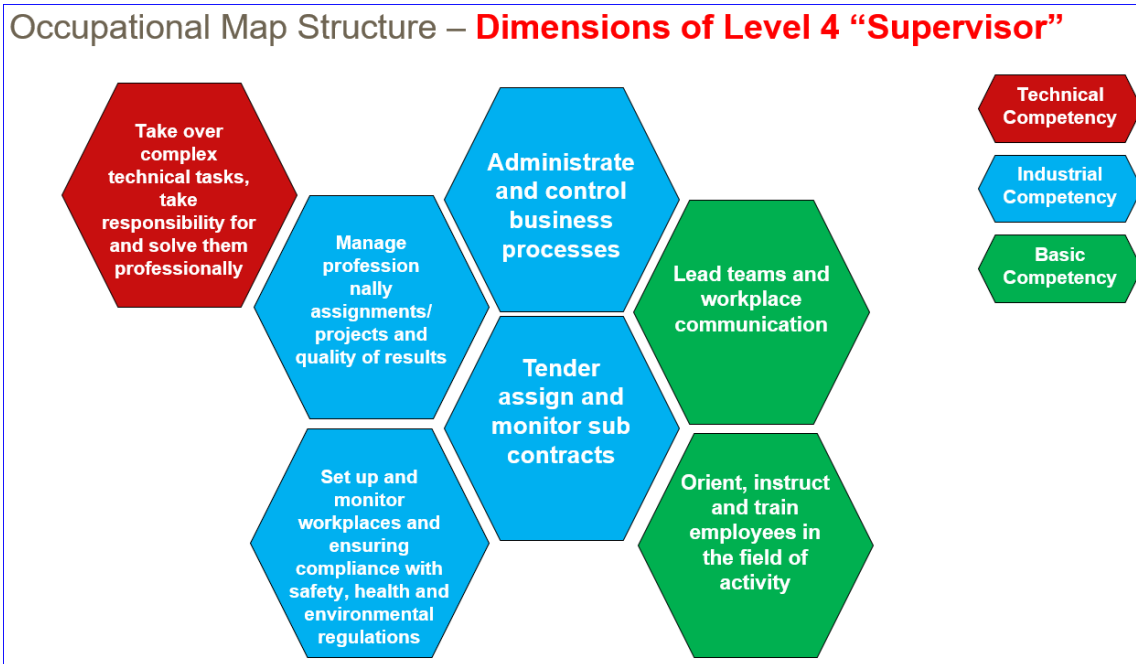
Under consideration of the limited time and human resources available to assess the competency needs of the envisaged occupations, the consultants developed and applied the method of “Competency Needs Reference Profiling”. The method predefines areas of professional activities for the envisaged occupations which are in the second step the basis for a questionnaire for a structured interview with representatives from industry (industry survey).

The questionnaires for the industry survey consisted of two major parts. The first part kept record of general data of the interviewed company, the second part contained the predefined competency raster for the related professional area.

Target persons for the interviews were mainly shop floor managers or production managers who have a broad overview about the job requirements and short comings of hired workers.

### Profiling level 4 occupations – Supervisor

A special challenge was the profiling of the necessary competences on level 4, supervisor. The experts developed a concept proposal based on the level descriptors, already developed standards and international agreements. This proposal was discussed at the workshops and, with a few modifications, used as a basis for the further development of the planned standards.



Due to the relatively high demands of the level descriptors with regard to cross-disciplinary competences for supervisors in the areas of work organization, administration and staff management, these are much more important than with the underlying competence levels. This was also essentially confirmed in the interviews.

The common areas of competencies were structures in 5 units and 51 competences

- ➞ Organize Production and Service Workshops
- ➞ Organize Construction Sites
- ➞ Process Job Orders
- ➞ Manage and Organize Business
- ➞ Manage and Develop Human Resources

The technical areas of competencies were defined, structured and agreed according to the professional requirements. Depending on the occupation, up to 7 units including 70 competences were surveyed.

### Implementation of the interviews

The interviews were conducted with strong participation of 5 to 10 representatives of NSSA and the sectorial committees in the regions of Yangon and Mandalay.

#### Electrical Sector – 13 Companies (> 50 employees):

Mechatronics: Production plants with mechatronic applications: Food, animal feed, packaging, intermediate products, medicines (previous study); in some cases with a high degree of automation

Building Automation: Engineering Services Companies and Contractors for the planning, installation and commissioning of special buildings e.g. hospitals, hotels, offices, shopping centers, factories, apartments

#### Metal Sector – 14 Companies (3 - 700 employees):

No clear separation by the trades. Many companies have the Machinery Fitter as well the Machine Tool Operator.

Main Activities are Machine Repair and Sheet Metal Work followed by Metal Construction. The products are a variation from Spare part production over Transformers to agricultural Equipment.

All 14 Companies together have 2.718 Employees and more than 87 Supervisors.

The results of the structured interviews provide a competency needs profile of the predefined areas of activities. Due to the limited number and composition of the interviewed companies, the competency needs profile requires additional interpretations. In our cases, the number of the interviewed companies is relatively low (< 15) and the focus of activities of particular companies is limited. Only the areas in which a company develops activities will be considered in the competency needs profiles.

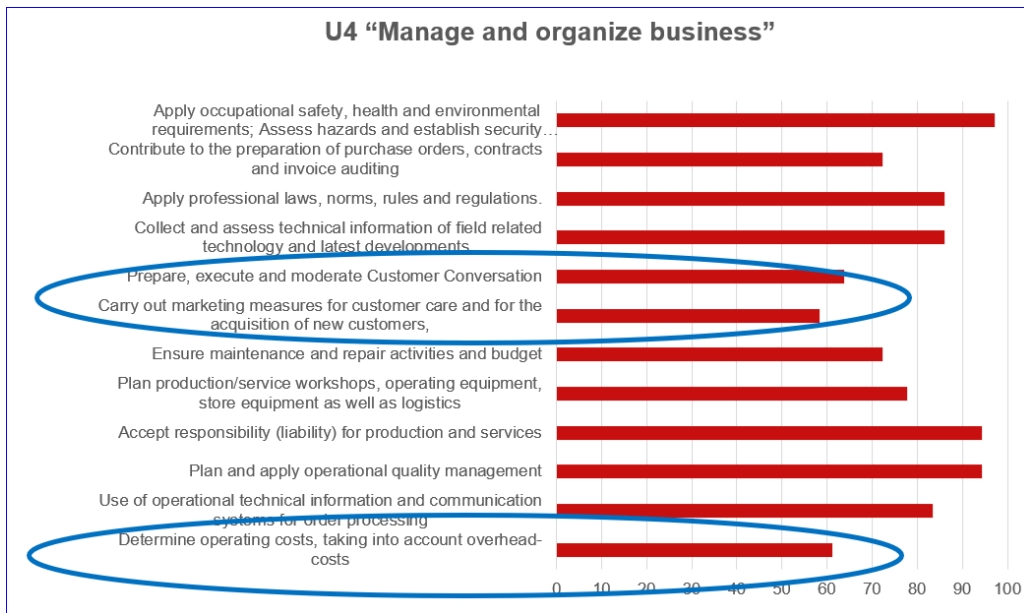
### Selected results of the industrial survey

Due to the rather technical-industrial orientation of the two occupational fields in the metal and electrical sector and the resulting large overlaps in the competence profiles, it was agreed that the cross-disciplinary competences for supervisors in the areas of work organization, administration and staff management will be used for all specializations.



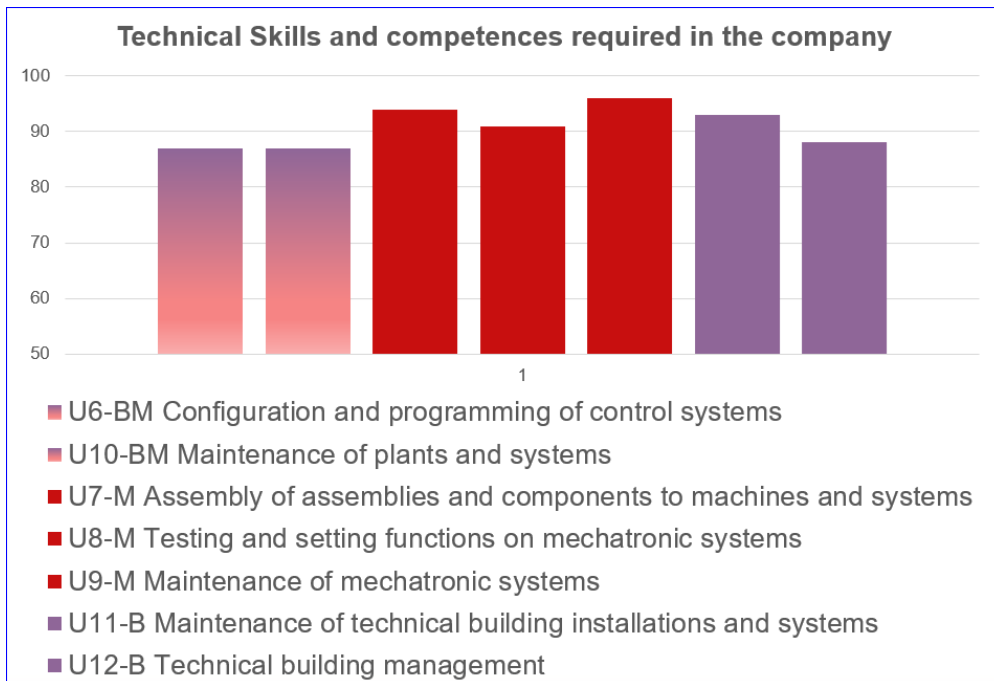
Relevance of common areas of competencies

The results were evaluated at unit level and competence level and interpreted accordingly. As can be seen in the diagram, with the exception of unit U4 “Manage and organize business”, all areas achieved a relevance of over 80%. An analysis at the competence level shows in which sub-competences there is less need. In this case these are “customer relations” and “cost calculations”.

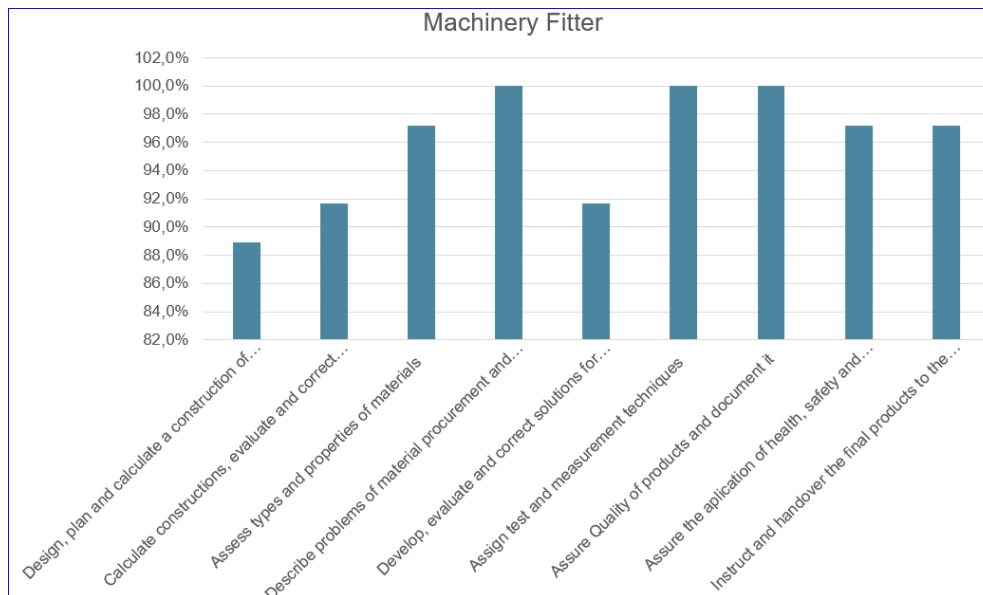


*Relevance of competencies on unit level*

The results of the technical units were processed and evaluated in a similar procedure. Depending on the interpretation, the results can be evaluated and utilized by switching between the Unit, Element, PC and KS levels or, in special cases, by revaluing or devaluing the results by changing the formulation.



*Relevance of competencies on unit level – Building Automation, Mechatronics*



*Relevance of competencies on unit level – Machinery Fitter*

## Structure of NOCS

When developing the structure of the NOCS, care was taken to identify commonalities and to adapt them only slightly to the requirements of the respective profession. This applied in particular to the interdisciplinary units. This was achieved in the following areas with only a few modifications:

- U3 Process Job Orders
- U4 Manage and Organize Business
- U5 Manage and Develop Human Resources

In the areas U1 “Organize Production and Service Workshops” and U2 “Organize Construction Sites”, a distinction had to be made between whether the main activities were carried out in production workshops or on construction sites. This is both the case for the occupation Machinery Fitter, therefore both areas were considered.

The technically oriented modules are focused according to the specialisations. Not all areas can be deepened, this is not necessary at level 4 because it was already addressed at lower levels. The focus here is more on developing skills, opening up new areas independently and systematically integrating them into the work process.

## Recommendations

According to the original planning, a joint workshop with representatives of the NSSA, the SC and some of the companies involved in the study was planned. At the workshop, the summarized results of the study were to be presented, discussed and put into context. This step could only be taken to a very limited extent after the conclusion of and in connection with the industry survey.

We recommend that the drafts of the NOCS now submitted for the two areas of metal and electrical engineering be discussed in detail in separate workshops with representatives of the NSSA, the Sectorial Committees concerned and, as far as possible, companies, and if necessary and sensible, that appropriate changes be made.

We are available to support and accompany the process in this step with our technical expertise.






After the formal verification of the NOCCS, at least one institution should develop the corresponding curricula for the provided standards in order to ensure implementation and use. Once an example is developed, the curricula can be easily adopted to other training institutes.

For this process, too, we are ready to provide technical support and assistance and can follow on from curricula already developed for levels 1 to 3.

## Annexes

1. Industrial Survey Machinery Fitter – Machine Tool Operator
2. Industrial Survey Building Automation – Mechatronics
3. Presentation Coordination and Concept Development Workshops with NSSA, Sectorial Committees
4. NOCS Machinery Fitter Level 4
5. NOCS Machine Toole Operator Level 4
6. MACS Building Automation Level 4
7. NOCS Mechatronics Level 4

### Examples: Questionnaire “General Data” and “Competency Profile”

   						
<p><b>Questionnaire</b></p> <p>for the identification of skills and competency needs in the Area of <b>Electrical Engineering/Mechatronics – Level 4</b></p>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Name of Interviewer</td> <td style="width: 35%;">1. Dr. Min Zaw Oo</td> <td style="width: 35%;">2. Arno Weller</td> </tr> </table>	Name of Interviewer	1. Dr. Min Zaw Oo	2. Arno Weller			
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Date of Interview: <b>26.07.2019</b>	Start: <b>3:00 pm</b>	End: <b>4:30 pm</b>				
<p><i>Preliminary remarks</i></p> <ul style="list-style-type: none"> <li>The purpose of this survey is the identification of typical skills and competences within the occupational area of <b>Electrical Engineering/ Mechatronics</b> and the actual requirement for qualified personnel in this field.</li> <li>The results of this survey enables us to improve the planning and execution of <b>non-academic</b> vocational education and training programs.</li> <li>Your participation in this survey is very important because it allows us to integrate your experiences into vocational education and training and to determine staff requirement in this area.</li> <li>This questionnaire has been developed for the aforesaid purposes - it contains some general questions and a summary of skills and competences for the <b>Supervisors (Level 4)</b></li> <li>All information and data will be dealt with confidentially and anonymously</li> </ul>						
<p><i>General chapter</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">1) Name of the Interview Partner: <b>May Thin I Linn</b> <b>Chan Myae Thu</b></td> <td style="width: 33%;">2) Position/Function: <b>Senior Engineer</b> <b>Senior Engineer</b></td> <td style="width: 34%;">3) Phone/E-Mail: <b>09 421124959</b> <b>09 428203242</b></td> </tr> </table>	1) Name of the Interview Partner: <b>May Thin I Linn</b> <b>Chan Myae Thu</b>	2) Position/Function: <b>Senior Engineer</b> <b>Senior Engineer</b>	3) Phone/E-Mail: <b>09 421124959</b> <b>09 428203242</b>			
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Competency Area (U) contains a list of activities, skills and competences which your technical staff should ideally possess. Please indicate its **relevance** by marking the respective box: (1) unimportant (2) less important (3) important.  
Ask for module (U) first and activities afterwards.

**In case Module (U) does not exist in your company cross out the whole page and do not ask for activities**

No.	Description	Relevance		
		← low 1	2	high → 3
<b>Area of Competency U9M "Maintenance of mechatronic systems"</b>				
81	Inspect mechatronic systems, check functions of safety devices and record tests			X
82	Maintain mechatronic systems according to maintenance and repair schedules, replace wearing parts as part of preventive maintenance			X
83	Dismantle devices and assemblies in accordance with their function and mark parts with regard to position and function assignment.		X	
84	Eliminate malfunctions by reworking and replacing parts and assemblies			X
85	Correct software errors		X	
86	Compare and set system parameters with predefined values		X	
87	Repair mechatronic systems in compliance with operational procedures		X	
88	Adapt mechatronic systems to changed operating conditions		X	
89	Use diagnostic and maintenance systems			X
<b>Training requirement for existing staff</b>		<input checked="" type="checkbox"/> <b>yes</b>	<input type="checkbox"/> <b>no</b>	
<b>Future requirement: (Please indicate the tendency)</b>		<input checked="" type="checkbox"/> <b>increasing</b>	<input type="checkbox"/> <b>stagnating</b>	<input type="checkbox"/> <b>decreasing</b>