

# Layout Engineer Level 5

QP Code: ASC/Q6403

NSQF Level: 5

Automotive Skills Development Council || Automotive Skills Development Council, Sat Paul Mittal Building, 1/6, Siri Institutional Area August Kranti Marg (Khel Gaon Marg) New Delhi - 110049

## Qualification Pack

### Contents

ASC/Q6403: Layout Engineer Level 5 .....	3
<i>Brief Job Description</i> .....	3
Applicable National Occupational Standards (NOS) .....	3
<i>Compulsory NOS</i> .....	3
<i>Qualification Pack (QP) Parameters</i> .....	3
ASC/N0006: Maintain a safe and healthy working environment .....	5
ASC/N0021: Maintain 5S at the work premises .....	10
ASC/N6407: Analyze the flow of men, machine, material and information in the process .....	17
ASC/N6408: Design the model layout for the process and validate .....	22
ASC/N6409: Plan for shifting of resources and implement the layout for the process .....	27
Assessment Guidelines and Weightage .....	31
<i>Assessment Guidelines</i> .....	31
<i>Assessment Weightage</i> .....	31

## Qualification Pack

### ASC/Q6403: Layout Engineer Level 5

#### Brief Job Description

Individuals at this job need to design, develop and implement the integrated facility layouts for the organization by planning and positioning employees, materials, machines, equipments and other Manufacturing supports and facilities for minimization of waste and material handling cost; thereby providing smooth flow of work, material and information throughout the organization.

#### Personal Attributes

This job requires the individual to work independently and be judicious in making decisions pertaining to his/her area of work. The individual should be result oriented. The individual should also be able to demonstrate skills for information ordering, oral expression, mathematical and deductive reasoning, artistic and spatial skills along with comprehension. The individual should be willing to work at shop floor based job for long hours.

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [ASC/N0006: Maintain a safe and healthy working environment](#)
2. [ASC/N0021: Maintain 5S at the work premises](#)
3. [ASC/N6407: Analyze the flow of men, machine, material and information in the process](#)
4. [ASC/N6408: Design the model layout for the process and validate](#)
5. [ASC/N6409: Plan for shifting of resources and implement the layout for the process](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Industrial Engineering
<b>Country</b>	India
<b>NSQF Level</b>	5
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/2144.1301

## Qualification Pack

<b>Minimum Educational Qualification &amp; Experience</b>	B.E./B.Tech (Industrial/Production/Mechanical Engineering ) with 3-5 Years of experience Not applicable
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	Basic fundamentals training courses for engineering drawing Simulation tools usage for layout design and development
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	23/09/2013
<b>Next Review Date</b>	31/03/2020
<b>NSQC Approval Date</b>	28/09/2015
<b>Version</b>	1.0

## Qualification Pack

### ASC/N0006: Maintain a safe and healthy working environment

#### Description

This NOS is about creating a Safe and Healthy work place, adhering to the safety guidelines in the working area, following practices which are not impacting the environment in a negative manner and training team members on health and safety related issues

#### Scope

The role holder will be responsible for identifying and reporting of risks creating and sustaining a safe, clean and environment friendly work place This NOS will be applicable to all Automotive sector manufacturing job roles

#### Elements and Performance Criteria

##### *Identify and report the risks identified*

To be competent, the user/individual on the job must be able to:

- PC1..** Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise
- PC2.** Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc
- PC3.** Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations
- PC4.** Create awareness amongst other by sharing information on the identified risks

##### *Create and sustain a Safe, clean and environment friendly work place*

To be competent, the user/individual on the job must be able to:

- PC5..** Follow the instructions given on the equipment manual describing the operating process of the equipments
- PC6..** Follow the Safety, Health and Environment related practices developed by the organization
- PC7.** Operate the machine using the recommended Personal Protective Equipments (PPE)
- PC8. .** Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc
- PC9.** Maintain high standards of personal hygiene at the work place
- PC10.** Ensure that the waste disposal is done in the designated area and manner as per organization SOP.
- PC11.** Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others

#### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to Health, Safety and Environment followed in the company

## Qualification Pack

- KU2.** basic knowledge of Safety procedures( fire fighting, first aid) within the organization
- KU3.** knowledge of various types of PPEs and their usage
- KU4.** basic knowledge of risks/hazards associated with each occupation in the organization
- KU5.** how to safely operate various tools and machines and risks associated with the tools/ equipment
- KU6.** knowledge of personal hygiene and how an individual can contribute towards creating a highly safe and clean working environment

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** read safety instructions put up across the plant premises
- GS3.** read safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- GS4.** effectively communicate information to team members
- GS5.** inform employees in the plant and concerned functions about events, incidents & potential risks observed related to Safety, Health and Environment.
- GS6.** question operator/ supervisor in order to understand the safety related issues
- GS7.** attentively listen with full attention and comprehend the information given by the speaker during safety drills and training programs
- GS8.** use common sense and make judgments during day to day basis
- GS9.** use reasoning skills to identify and resolve basic problems
- GS10.** use common sense and make judgments during day to day basis
- GS11.** use reasoning skills to identify and resolve basic problems

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Identify and report the risks identified</i>	<b>8</b>	<b>23</b>	-	-
<b>PC1..</b> Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	3	6	-	-
<b>PC2.</b> Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc	2	6	-	-
<b>PC3.</b> Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations	2	6	-	-
<b>PC4.</b> Create awareness amongst other by sharing information on the identified risks	1	5	-	-
<i>Create and sustain a Safe, clean and environment friendly work place</i>	<b>17</b>	<b>52</b>	-	-
<b>PC5..</b> Follow the instructions given on the equipment manual describing the operating process of the equipments	3	7	-	-
<b>PC6..</b> Follow the Safety, Health and Environment related practices developed by the organization	3	8	-	-
<b>PC7.</b> Operate the machine using the recommended Personal Protective Equipments (PPE)	3	8	-	-
<b>PC8. .</b> Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc	2	8	-	-
<b>PC9.</b> Maintain high standards of personal hygiene at the work place	2	7	-	-
<b>PC10.</b> Ensure that the waste disposal is done in the designated area and manner as per organization SOP.	3	8	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11.</b> Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others	1	6	-	-
<b>NOS Total</b>	<b>25</b>	<b>75</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N0006
<b>NOS Name</b>	Maintain a safe and healthy working environment
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Maintenance
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	15/09/2013
<b>Next Review Date</b>	15/09/2015
<b>NSQC Clearance Date</b>	20/07/2015

## Qualification Pack

### ASC/N0021: Maintain 5S at the work premises

#### Description

This NOS is about ensuring all 5 S activities both at the shop floor and the office area to facilitate increase in work productivity

#### Scope

The individual needs to. Ensure sorting, streamlining & organizing, storage and documentation, cleaning, standardization and sustenance across the plant and office premises of the organization

#### Elements and Performance Criteria

##### *Ensure sorting*

To be competent, the user/individual on the job must be able to:

- PC1..** follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.
- PC2..** ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions
- PC3..** follow the technique of waste disposal and waste storage in the proper bins as per sop
- PC4..** segregate the items which are labelled as red tag items for the process area and keep them in the correct places
- PC5.** sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions
- PC6. .** ensure that areas of material storage areas are not overflowing
- PC7.** properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required
- PC8.** return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area
- PC9.** follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards
- PC10.** follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists

##### *Ensure proper documentation and storage ( organizing , streamlining)*

To be competent, the user/individual on the job must be able to:

- PC11.** check that the items in the respective areas have been identified as broken or damaged
- PC12.** follow the given instructions and check for labelling of fluids, oils. lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc
- PC13.** make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions

##### *Ensure cleaning of self and the work place*

To be competent, the user/individual on the job must be able to:

## Qualification Pack

- PC14.** check whether safety glasses are clean and in good condition
- PC15.** keep all outside surfaces of recycling containers are clean
- PC16..** ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards
- PC17..** check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up
- PC18..** ensure workbenches and work surfaces are clean and in good condition
- PC19.** follow the cleaning schedule for the lighting system to ensure proper illumination
- PC20.** store the cleaning material and equipment in the correct location and in good condition
- PC21.** ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene

### *Ensure sustenance*

To be competent, the user/individual on the job must be able to:

- PC22.** follow the daily cleaning standards and schedules to create a clean working environment
- PC23.** attend all training programs for employees on 5 s
- PC24.** support the team during the audit of 5 s
- PC25.** participate actively in employee work groups on 5s and encourage team members for active participation
- PC26.** follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to 5S followed in the company
- KU2.** have basic knowledge of 5S procedures
- KU3.** know various types 5s practices followed in various areas
- KU4.** understand the 5S checklists provided in the department/ team
- KU5.** have skills to identify useful & non useful items
- KU6.** have knowledge of labels , signs & colours used as indicators
- KU7.** knowledge on how to sort and store various types of tools, equipment, material etc.
- KU8.** know , how to identify various types of waste products
- KU9.** understand the impact of waste/ dirt/ dust/unwanted substances on the process/ environment/ machinery/ human body
- KU10.** have knowledge of best ways of cleaning & waste disposal
- KU11.** understand the importance of standardization in processes
- KU12.** understand the importance of sustainability in 5S
- KU13.** have knowledge of TQM process
- KU14.** have knowledge of various materials and storage norms
- KU15.** understand visual controls, symbols, graphs etc.

## Qualification Pack

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** write basic level notes and observations
- GS2.** note down observations (if any) related to the process
- GS3.** read 5S instructions put up across the plant premises
- GS4.** effectively communicate information to team members inform employees in the plant and concerned functions about 5S
- GS5.** question the process head in order to understand the 5S related issues
- GS6.** attentively listen with full attention and comprehend the information given by the speaker during 5S training programs
- GS7.** use common sense and make judgments during day to day basis
- GS8.** use reasoning skills to identify and resolve basic problems using 5S
- GS9.** persuade co team members to follow 5 S
- GS10.** ensure that the co team members understand the importance of using 5 S tool
- GS11.** use innovative skills to perform and manage 5 S activities at the work desk and the shop floor
- GS12.** exhibit inquisitive behaviour to seek feedback and question on the existing set patterns of work
- GS13.** do what is right, not what is a popular practices
- GS14.** follow shop floor rules& regulations and avoid deviations; make 5S an integral way of life
- GS15.** ensure self-cleanliness on a daily basis
- GS16.** demonstrate the will to keep the work area in a clean and orderly manner

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure sorting</i>	<b>10</b>	<b>30</b>	-	-
<b>PC1..</b> follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.	1	3	-	-
<b>PC2..</b> ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions	1	3	-	-
<b>PC3..</b> follow the technique of waste disposal and waste storage in the proper bins as per sop	1	3	-	-
<b>PC4..</b> segregate the items which are labelled as red tag items for the process area and keep them in the correct places	1	3	-	-
<b>PC5.</b> sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions	1	3	-	-
<b>PC6. .</b> ensure that areas of material storage areas are not overflowing	1	3	-	-
<b>PC7.</b> properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required	1	3	-	-
<b>PC8.</b> return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1	3	-	-
<b>PC9.</b> follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards	1	3	-	-
<b>PC10.</b> follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists	1	3	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure proper documentation and storage (organizing , streamlining)</i>	<b>3</b>	<b>9</b>	-	-
<b>PC11.</b> check that the items in the respective areas have been identified as broken or damaged	1	3	-	-
<b>PC12.</b> follow the given instructions and check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc	1	3	-	-
<b>PC13.</b> make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions	1	3	-	-
<i>Ensure cleaning of self and the work place</i>	<b>8</b>	<b>24</b>	-	-
<b>PC14.</b> check whether safety glasses are clean and in good condition	1	3	-	-
<b>PC15.</b> keep all outside surfaces of recycling containers are clean	1	3	-	-
<b>PC16..</b> ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards	1	3	-	-
<b>PC17..</b> check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up	1	3	-	-
<b>PC18..</b> ensure workbenches and work surfaces are clean and in good condition	1	3	-	-
<b>PC19.</b> follow the cleaning schedule for the lighting system to ensure proper illumination	1	3	-	-
<b>PC20.</b> store the cleaning material and equipment in the correct location and in good condition	1	3	-	-
<b>PC21.</b> ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene	1	3	-	-
<i>Ensure sustenance</i>	<b>4</b>	<b>12</b>	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC22.</b> follow the daily cleaning standards and schedules to create a clean working environment	1	3	-	-
<b>PC23.</b> attend all training programs for employees on 5 s	0.5	2	-	-
<b>PC24.</b> support the team during the audit of 5 s	1	3	-	-
<b>PC25.</b> participate actively in employee work groups on 5s and encourage team members for active participation	0.5	2	-	-
<b>PC26.</b> follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions	1	2	-	-
<b>NOS Total</b>	<b>25</b>	<b>75</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N0021
<b>NOS Name</b>	Maintain 5S at the work premises
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	15/03/2014
<b>Next Review Date</b>	15/03/2016
<b>NSQC Clearance Date</b>	

## Qualification Pack

# ASC/N6407: Analyze the flow of men, machine, material and information in the process

## Description

This OS unit is about the study and analysis of the various resources of a process like the materials, manpower, equipments etc. for designing the most economic and feasible layout for it

## Scope

The unit/ task covers the following: Analyzing the machinery and manpower allocation for the process in coordination with the respective process design engineers Studying the material movement within the process Assessing the flow of information throughout the process

## Elements and Performance Criteria

### *Analysis of the machinery and manpower*

To be competent, the user/individual on the job must be able to:

- PC1..** study the existing shop floor layout in-depth being used for the manufacturing process and gather inputs pertaining to the floor area, no of workstations, type of machinery used etc.
- PC2..** measure the dimensions of the machinery and equipments and calculate the area occupied
- PC3..** get similar details in respect of npd (new product development)
- PC4..** study the manpower allocation plan thoroughly and collect key insights about the workforce requirements and the nature of work being done by them
- PC5..** record the observations for further analysis.
- PC6..** participate in the trials with process engineers for validation

### *Study of the material movement within the process*

To be competent, the user/individual on the job must be able to:

- PC7..** understand the complete material flow in the process starting from receipt of raw materials till delivery of finished product
- PC8..** analyze the conditions that would be required for storage of various process materials and also study the existing facility being used for it
- PC9..** collect all the information related to the material handling facilities that are/would be in use for the process
- PC10..** record all these observations for further analysis.

### *Assessment of information flow*

To be competent, the user/individual on the job must be able to:

- PC11..** interact with the shop floor workers and prepare a complete flow chart depicting the flow of information throughout the process and also gain knowledge about the media in use for it.
- PC12..** record all these observations for further analysis

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

## Qualification Pack

- KU1.** company manufacturing processes
- KU2.** existing layout for the processes
- KU3.** sequence of operations for each process
- KU4.** facility planning methodology being followed in the company
- KU5.** future capacity expansions plans (if any) of the company
- KU6.** complete knowledge of the process in consideration
- KU7.** dimensions and type of the existing facility being used for the process
- KU8.** engineering drawings of existing layout
- KU9.** operation of machinery and equipments being used for the process
- KU10.** manpower deployment plan for process
- KU11.** material and information flow of the process
- KU12.** capacity utilization levels and the cost of manufacturing being incurred
- KU13.** media of information flow like SAP , ERP etc.

## Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** read the information displayed at the workplace
- GS2.** draft a pictorial representation of the existing layout for better comprehension
- GS3.** compile all the data related to study of existing facility in the form of presentations and reports
- GS4.** communicate with shop floor workers gathering inputs/requirements
- GS5.** spell out effectively the findings of the study to the higher management in meetings
- GS6.** interact with workers and gather all the information related to process requirements
- GS7.** share operation knowledge with co-workers
- GS8.** coordinate with the facility planning department team and ensure timely analysis for layout designing
- GS9.** collate data from various third parties involved (if any) in existing facility design and development
- GS10.** plan the execution of requirements study for layout design in an effective manner and on timely basis
- GS11.** analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification/redesigning

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Analysis of the machinery and manpower</i>	<b>16</b>	<b>37</b>	-	-
<b>PC1..</b> study the existing shop floor layout in-depth being used for the manufacturing process and gather inputs pertaining to the floor area, no of workstations, type of machinery used etc.	3	7	-	-
<b>PC2..</b> measure the dimensions of the machinery and equipments and calculate the area occupied	3	7	-	-
<b>PC3..</b> get similar details in respect of npd (new product development)	3	7	-	-
<b>PC4..</b> study the manpower allocation plan thoroughly and collect key insights about the workforce requirements and the nature of work being done by them	3	7	-	-
<b>PC5..</b> record the observations for further analysis.	1	3	-	-
<b>PC6..</b> participate in the trials with process engineers for validation	3	6	-	-
<i>Study of the material movement within the process</i>	<b>10</b>	<b>24</b>	-	-
<b>PC7..</b> understand the complete material flow in the process starting from receipt of raw materials till delivery of finished product	4	7	-	-
<b>PC8..</b> analyze the conditions that would be required for storage of various process materials and also study the existing facility being used for it	3	7	-	-
<b>PC9..</b> collect all the information related to the material handling facilities that are/would be in use for the process	2	7	-	-
<b>PC10..</b> record all these observations for further analysis.	1	3	-	-
<i>Assessment of information flow</i>	<b>4</b>	<b>9</b>	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11..</b> interact with the shop floor workers and prepare a complete flow chart depicting the flow of information throughout the process and also gain knowledge about the media in use for it.	3	6	-	-
<b>PC12..</b> record all these observations for further analysis	1	3	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N6407
<b>NOS Name</b>	Analyze the flow of men, machine, material and information in the process
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Industrial Engineering
<b>NSQF Level</b>	5
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	23/09/2013
<b>Next Review Date</b>	30/09/2015
<b>NSQC Clearance Date</b>	

## Qualification Pack

### ASC/N6408: Design the model layout for the process and validate

#### Description

This OS unit is about the industrial engineer drafting , designing and validating the model layout for the process in consideration ensuring integration of men , machine material and information leading to maximization of operation efficiency

#### Scope

The unit/ task covers the following: Preparing a blueprint of the proposed facility layout Developing a model layout Validating the model layout by simulation & Process trials

#### Elements and Performance Criteria

##### *Preparation of blueprint*

To be competent, the user/individual on the job must be able to:

- PC1..** based on the inputs obtained from the study of existing facility layout , contemplate changes for new layout
- PC2..** prepare a blueprint of the new layout by measuring and studying available floor space and henceforth drawing plan of floor space to scale, using drafting tools

##### *Development of model layout*

To be competent, the user/individual on the job must be able to:

- PC3..** coordinate all available knowledge and information into blueprint, showing most efficient location for each piece of equipment and necessary working area and prepare a master layout
- PC4..** draft a production process model ensuring minimization of the distance traveled, backtracking, cross traffic, and production costs
- PC5..** build the facility model ensuring addressing of factors like adequate number of workstations, correct work height, appropriate lighting, and enough operator space in co-ordination with process design engineers (NPD)
- PC6..** integrate the two and prepare the working model for new facility

##### *Simulation of model layout*

To be competent, the user/individual on the job must be able to:

- PC7..** validate the model facility layout using the latest simulation techniques
- PC8..** identify the mistakes/areas of improvement in the layout and take appropriate rectification measures
- PC9..** implement the measures and re-simulate the modified layout
- PC10..** repeat the first three steps till the model layout is free from any discrepancies

##### *Compliance to design standards*

To be competent, the user/individual on the job must be able to:

- PC11..** ensure that the guidelines mentioned in facility designing standards are strictly adhered to for preparation of the model layout

## Qualification Pack

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** company manufacturing processes
- KU2.** existing layout for the processes
- KU3.** facility designing standards followed in the organization
- KU4.** third parties (if any) involved in construction of facilities for the organization
- KU5.** facility planning methodology being followed in the company
- KU6.** complete knowledge of the process in consideration
- KU7.** type of the layout to be developed like product, process, U type etc.
- KU8.** engineering drawings of existing layout
- KU9.** operation of machinery and equipments being used for the process
- KU10.** complete knowledge of material and information flow for the process
- KU11.** latest simulation techniques used for validation of model layouts

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** compile all the data related to layout design and development in form of reports and presentations
- GS2.** understand the drawings of layout
- GS3.** communicate the new layout design and development to the higher management in meetings for their support
- GS4.** interact with workers and gather all the information related to process requirements
- GS5.** coordinate with the facility planning, process engineering department team and ensure model layout designing on timely basis
- GS6.** collate resources from various third parties involved (if any) for the facility layout implementation
- GS7.** plan the execution of layout design and development in an effective manner and on timely basis
- GS8.** analyze the results obtained after running simulation and identifying the measures for resolving the discrepancies arising out of it
- GS9.** assess the problem, evaluate the possible solution(s) and use an optimum /best possible solution(s)
- GS10.** identify immediate or temporary solutions to resolve delays and crisis situations
- GS11.** how to learn from past mistakes to resolve technical and non-technical problems

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Preparation of blueprint</i>	<b>6</b>	<b>13</b>	-	-
<b>PC1..</b> based on the inputs obtained from the study of existing facility layout , contemplate changes for new layout	3	6	-	-
<b>PC2..</b> prepare a blueprint of the new layout by measuring and studying available floor space and henceforth drawing plan of floor space to scale, using drafting tools	3	7	-	-
<i>Development of model layout</i>	<b>12</b>	<b>27</b>	-	-
<b>PC3..</b> coordinate all available knowledge and information into blueprint, showing most efficient location for each piece of equipment and necessary working area and prepare a master layout	3	7	-	-
<b>PC4..</b> draft a production process model ensuring minimization of the distance traveled, backtracking, cross traffic, and production costs	3	7	-	-
<b>PC5..</b> build the facility model ensuring addressing of factors like adequate number of workstations, correct work height, appropriate lighting, and enough operator space in co-ordination with process design engineers (NPD)	3	7	-	-
<b>PC6..</b> integrate the two and prepare the working model for new facility	3	6	-	-
<i>Simulation of model layout</i>	<b>10</b>	<b>25</b>	-	-
<b>PC7..</b> validate the model facility layout using the latest simulation techniques	3	7	-	-
<b>PC8..</b> identify the mistakes/areas of improvement in the layout and take appropriate rectification measures	3	7	-	-
<b>PC9..</b> implement the measures and re-simulate the modified layout	3	6	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10..</b> repeat the first three steps till the model layout is free from any discrepancies	1	5	-	-
<i>Compliance to design standards</i>	<b>2</b>	<b>5</b>	-	-
<b>PC11..</b> ensure that the guidelines mentioned in facility designing standards are strictly adhered to for preparation of the model layout	2	5	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N6408
<b>NOS Name</b>	Design the model layout for the process and validate
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Industrial Engineering
<b>NSQF Level</b>	5
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	23/09/2013
<b>Next Review Date</b>	30/09/2015
<b>NSQC Clearance Date</b>	

## Qualification Pack

# ASC/N6409: Plan for shifting of resources and implement the layout for the process

## Description

This OS unit is about the shifting and arrangement of manpower ,machinery , equipments and other facilities for implementation of the new finalized layout

## Scope

This unit/ task covers the following: Arrangement and repositioning of resources in accordance to the new facility layout Implementation of the new layout

## Elements and Performance Criteria

### *Arrangement of resources*

To be competent, the user/individual on the job must be able to:

- PC1..** as per the finalized model of facility layout for the process in consideration, arrange for shifting and repositioning of workforce , machinery , equipments, materials and other support facilities in consultation with production have a fallback action plan in place.
- PC2..** carry out the shifting process as per the plan taking care that adequate safety stock has been built by production for the lines affected by the layout change & timing plan is closely monitored.
- PC3..** check risks related to hazards , safety are mitigated adequately in the new layout .
- PC4..** in case of any discrepancy/issues arising due to rearrangement , escalate the matter to higher management and ensure addressing of same on timely basis

### *Implementation of new layout*

To be competent, the user/individual on the job must be able to:

- PC5..** after arrangement of resources , implement the new facility layout as per the finalized model
- PC6..** monitor the functioning of layout on a periodic basis and sort out the discrepancies arising during same

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** company manufacturing processes
- KU2.** existing layout for the processes
- KU3.** facility designing standards followed in the organization
- KU4.** third parties (if any) involved in construction of facilities for the organization
- KU5.** complete knowledge of the process in consideration
- KU6.** type of the layout to be developed like product, process, u type etc.
- KU7.** engineering drawings of existing layout
- KU8.** operation of machinery and equipments being used for the process

## Qualification Pack

**KU9.** complete knowledge of material and information flow for the process

**KU10.** attest simulation techniques used for validation of model layouts

### Generic Skills (GS)

User/individual on the job needs to know how to:

- GS1.** compile all the data related to layout planning and implementation in form of reports and presentations
- GS2.** understand the drawings of layout
- GS3.** communicate the layout implementation status to higher management in form of presentations
- GS4.** interact with workers and gather all the information related to process requirements
- GS5.** coordinate with the facility planning department team and ensure model layout designing on timely basis
- GS6.** collate resources from various third parties involved (if any) for the facility layout implementation
- GS7.** plan the execution of time study so that he can finish compilation of the data activity wise in the stipulated time
- GS8.** analyze the implementation of the finalized layout design and think of measures to resolve the issues arising after same
- GS9.** assess the problem, evaluate the possible solution(s) and use an optimum /best possible solution(s)
- GS10.** identify immediate or temporary solutions to resolve delays and crisis situations
- GS11.** how to learn from past mistakes to resolve technical and nontechnical problems

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Arrangement of resources</i>	<b>20</b>	<b>46</b>	-	-
<b>PC1..</b> as per the finalized model of facility layout for the process in consideration, arrange for shifting and repositioning of workforce , machinery , equipments, materials and other support facilities in consultation with production have a fallback action plan in place.	5	12	-	-
<b>PC2..</b> carry out the shifting process as per the plan taking care that adequate safety stock has been built by production for the lines affected by the layout change & timing plan is closely monitored.	5	12	-	-
<b>PC3..</b> check risks related to hazards , safety are mitigated adequately in the new layout .	5	12	-	-
<b>PC4..</b> in case of any discrepancy/issues arising due to rearrangement , escalate the matter to higher management and ensure addressing of same on timely basis	5	10	-	-
<i>Implementation of new layout</i>	<b>10</b>	<b>24</b>	-	-
<b>PC5..</b> after arrangement of resources , implement the new facility layout as per the finalized model	5	12	-	-
<b>PC6..</b> monitor the functioning of layout on a periodic basis and sort out the discrepancies arising during same	5	12	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ASC/N6409
<b>NOS Name</b>	Plan for shifting of resources and implement the layout for the process
<b>Sector</b>	Automotive
<b>Sub-Sector</b>	Manufacturing
<b>Occupation</b>	Industrial Engineering
<b>NSQF Level</b>	5
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	23/09/2013
<b>Next Review Date</b>	30/09/2015
<b>NSQC Clearance Date</b>	

## Qualification Pack

### Assessment Guidelines and Assessment Weightage

#### Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

**Recommended Pass % aggregate for QP : 75**

#### Assessment Weightage

##### Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	10
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	10
ASC/N6407.Analyze the flow of men, machine, material and information in the process	30	70	-	-	100	30

### Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N6408.Design the model layout for the process and validate	30	70	-	-	100	30
ASC/N6409.Plan for shifting of resources and implement the layout for the process	30	70	-	-	100	20
<b>Total</b>	<b>140</b>	<b>360</b>	<b>-</b>	<b>-</b>	<b>500</b>	<b>100</b>