



HD46/05 – QUALITY MANAGEMENT SYSTEMS FOR HIGHWAY DESIGN

Accreditation, Registration and Assessment Guidance for Certification Bodies

HD46-CBG

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INTRODUCTION

This guidance to Certification Bodies focuses specifically with the Highway Agency Document HD 46/05. It must be read in association with the most recent version of that document which is available at :

HD 46/05 sets down the ISO9001:2000 based quality management system which Highway Designers are required to comply with when carrying out work on behalf of Overseeing Organisations that are carrying out

- a) feasibility and other studies
- b) new works, temporary works, maintenance and renewal works
- c) work for other contracting organisations
- d) work as suppliers to other designers

HD46/05 requires Highway Designers to implement a competency management system within their organisations. To ensure consistency the Highway's Agency and UKAS have agreed that the Certification bodies shall implement the competency management system to ensure the initial and ongoing competency of their assessors. This document guides Certification Bodies on the HA's and UKAS's expectations placed on CB's to meet that requirement.

In addition, to provide consistent assessment interpretation and application of HD 46, the assessment and certificate guidance detailed in Part III shall be maintained and updated as the main assessment guidance reference point for Certification Bodies.

The National Highway Sector Schemes Certification Bodies Co-ordination Group is responsible for supplying the content of this guidance document, which is be posted on the UKAS Publications page in association with the National Highway Sector Schemes

Part 1

Guidance to CB's on implementing a competency management system which will satisfy UKAS accreditation assessment.

As it is an HA requirement that Certification Bodies shall adopt and implement a competence management system based on the model system defined in Appendix C of the HD46 document for the identification, training, development and ongoing monitoring of assessors carrying out these assessments, this part of the guide has been developed to assist CB's in meeting the requirement.

Appendix C of HD46 (see Annex 1 to this guide) defines requirements for the process of developing Competence Management Systems. Certification Bodies' delivering assessments against this specification are required to develop and operate such a system to demonstrate initial and on going competence of their assessors.

When being accredited by UKAS adequate operation of the Competence Management System will be considered. Failure to satisfy UKAS of adequate implementation against Appendix C as interpreted in this guidance will be considered as a non-conformance which may lead to a negative recommendation for accreditation.

The CMS process if undertaken correctly will be iterative.

CB's should maintain all notes and records to demonstrate this iterative process. These notes and records should be available to UKAS and form the basis of evidence provided during the accreditation and on going surveillance process.

These notes and records should also be retained to facilitate the review and updating of the competency as requirements develop and change.

The competency management process should be specific to the roles being assessed.

The outputs from the CMS will include Competency specifications for each of the roles determined during identification of assessment activities.

An example of a competency specification or matrix is given in Example 1 below (produce a matrix like in the appendix C)

The following guidance and recommendations if followed will be accepted by Accreditation Bodies as demonstrating adequate implementation. CB's may however take equivalent approaches provided they can satisfy their accreditation body of the equivalence.

Definitions

Competence: is the demonstrated ability to effectively apply appropriate knowledge, skills and technical understanding to undertake roles and activities in a manner which meets defined levels of achievement.

Timely: achievement or maintenance of competence before activities requiring application of an accepted level of capability are carried out

Effective Deployment: means assignment of adequately competent personnel in a manner which, shares work out to balance experience and maintenance of knowledge.

Guidance on development and implementation of the Competency Management System

Meeting Principles 1 and 2

Identification of HD46 related activities and the timely achievement of the competencies required to deliver those activities as expected

Ensuring that the personnel involved with HD46 activities are competent to undertake the roles assigned to them

CB's should study their end to end processes from point of application to continuous surveillance to identify the human input involved, determine the roles and activities, and identify the qualifications, skills, knowledge, technical understanding, and experience necessary to be competent in the role.

Examples are as follows:

Sales and Applications processes:

Where sales and applications personnel are involved with the assignment of assessment staff they need to be aware of the content and understand HD 46 requirements to ensure competent assessors are assigned. This is expected to be show in a manner that is appropriate to the CB's method of operation but will ensure the sales and applications personnel have the relevant competence to correctly assign assessors to the assessments.

Assessment planning processes

Where planning personnel are involved with the assignment of assessment staff they need to be aware of the content and understand HD 46 requirements to ensure competent assessors are assigned. This may be given in CB specific processes which ensure the personnel have the relevant competence to correctly assign assessors to the assessments.

Assessment Team Competency:

The CB is expected to have a process for the establishment of team competency for assessing designers whose scoping covers the areas detailed in Appendix D or some of those areas.

Observation of Witnessed assessments or other means of assessing competency:

Technical Management responsible for assessing competency shall be competent to undertake the role. Their competency shall have been determined through application of the CMS process.

Conducting assessments against the scheme:

As this is fundamental to the assessment of HD46 by assessors, more detailed guidance is given below on the expectations with respect to the qualifications, skills, knowledge, technical understanding and experience.

Qualifications (accomplishments fitting the person for the role or activity):

Qualified to carry out ISO9001:2000 assessments according to the CB's ISO9001:2000 assessor competency requirements.

Skills (practiced abilities)

Able to read, interpret and apply the requirements of the scheme wording to live design situations specified in the scope of HD 46

Able to lead HD 46 assessment teams if undertaking a lead role:

Appropriate knowledge: (specific information, facts and/or intelligence expected theoretically or practically to be understood about the subject or activity)

Know and understand the content and application of the HD 46 scheme particularly:

Knowledge of Chapter 1 to 8; the assessor must demonstrate competence in his/her knowledge of chapters 1 to 8. This may be demonstrated through requiring the assessor to answer questions about chapter 1 to 8 during a competency interview or by witnessed assessment.

Be aware of the guidance in Appendix A; Note this is awareness rather than knowledge is considered acceptable.

Have knowledge of the contents of Appendix B sufficient to recall the contents and be aware of what shall be in the Quality Plan;

Be aware of what a competency management system is and to recognize if one is in place, works effectively and therefore demonstrates competence;

Be able to formulate and evaluate the suitability of the scope of assessment.

Have knowledge of some or all of the Design Subject Areas in Appendix D; (see note re assessment teams):

Have awareness and the expectations of Appendix E.

Technical Understanding: (mastery of the mechanical arts and applied sciences applicable to the activity or role to enable correct judgment of an activity or situations capability to achieve its purpose)

It is expected that the Appendix D areas and broader understanding of Construction Design Management; will have been used as the basis for the technical understanding processes.

The CB is expected to have determined the technical understanding required by their assessors, to be able to demonstrate the processes employed for arriving at that level of technical understanding, and to demonstrate how their assessors are shown to have that understanding.

It is not expected that assessors know all the design areas but their competence will extend to the capability to refer to reference on what they expect to see for these areas.

Annex 3 provides guidance on expectations for assessors experience to enable them to carry out competent technical aspect assessments of the design project.

Reporting of the assessment:

Standard ISO90001:2000 reporting skill, knowledge and technical understanding is expected to be considered as a competence requirement

Certification decisions:

The competency requirements of personnel undertaking assessment decisions is expected to have been determined; It is expected that the reviewer shall be able to balance evidence in reports against scheme requirements and determine that a correct decision has been reached;

To do this it is expected that such personnel shall:

Have knowledge of Chapter 1 to 8. The review personnel are expected to be competent in his/her knowledge of chapters 1 to 8. This may be demonstrated through requiring the reviewer having to answer questions about chapter 1 to 8 during a competency interview or by questioned witnessing of the review process by competent technical management

Be aware of the guidance in Appendix A;

Have knowledge of the contents of appendix B sufficient to recall the contents and be aware of what shall be in the QP;

Be aware of what a competency management system is and to recognize if a completed assessment has demonstrated that one is in place, works effectively and therefore demonstrates competence of the organisation.

Be able to formulate and evaluate the suitability of the scope of assessment.

Have broad knowledge of the Design Subject Areas in Appendix D; (see note re assessment teams):

Awareness and the expectations of Appendix E. (Model Form for this)

It may be that the Certification Decision has to be a team decision in which case the CB shall be able to demonstrate team competence

The CB should go on to consider other processes to ensure competent assessments are carried out. This may extend to the knowledge, skill and technical understanding of personnel who assign or re-assign assessors to HD46 clients or any other similar processes

Principle 3

Demonstrating the processes operated for recruitment, training, gaining of practical assessment (role) experience, monitoring, continuous professional development, and verification of competency of HD46 assessors (roles).

This principle follows on from carrying out principles 1 and 2 which have been performed to identify roles and appropriate knowledge, skills and technical understanding.

Recruitment:

If specifically recruiting an assessor for HD 46 activities it is expected that there will be a personnel specification which demonstrates that the competencies required above are considered when making the candidate selection;

Off assessment (or role) Training:

For the purposes of the competency management system training has been identified as off assessment (role) training e.g. look and listen in a training room, web based training, and On-assessment (role) training, e.g. by observing another assessor (or person undertaking the role)

It is expected where off assessment training has been provided, that all potential HD46 assessors will be required to complete a competency assessment in a manner suitable to the CB's methods of working which demonstrates how the assessor meets the competency criteria above; this may result in an assessment sheet which is evaluated to establish where there are deficiencies and thus identifies if further off assessment training is required.; it is expect that in these circumstances assessors will then be provided with the off assessment training to bring them up to the required levels of knowledge, skills and technical capability specified above;

Gathering of practical on assessment (role) experience:

It is expected that the assessor (person undertaking a role) after off assessment (role) training will carry out on-assessment (role) training under the observation of for example an HD46 trained assessor (or person trained in a role) if they are not an experienced 9001:2000 assessor. It would be expected that Qualified and Experienced Assessors would undertake their on-assessments unobserved but their assessment reports shall be reviewed to the satisfaction of for example a Technical Reviewer.

Monitoring:

It would be expected that for unobserved assessments, The assessment report and if appropriate assessors notes will be reviewed in detail to ensure that the assessment has been conducted with the appropriate rigor. If inadequate more coaching or training takes place. Monitoring shall consider each of the areas of competence detailed as a result of the activities in principles 1 and 2 above

Continuous Professional Development:

Maintenance of competency is considered as important and it is expected that the CB will have a process in place which not only maintains the level of competency identified though principles 1 and 2, but ensures that personnel are developed in line

with the ongoing and changing competency requirements which will happen as the HD46 implementation and on going application occurs.

Principle 4

Evaluating the effectiveness of delivered HD46 assessor (role) training.

It is expected that results of monitoring for each e.g. areas of competence identified in principles 1 and 2 above shall be maintained and evaluated by, for example an assessment manager to ensure that any deficiencies identified in the on assessment or off assessment training activities are reviewed for trends.

It is expected that effectiveness could be demonstrated through one or more of the following: witnessed audits or competency interviews or technical reviews

It is expected that if training is shown not to be effective a process of re-training action would be taken and the training modified to be effective the next time it is delivered.

It is expected that evidence and records shall be maintained of actions that have been taken where this situation has occurred.

Principle 5

Undertaking reviews of HD46 assessor (role) competency at regular intervals appropriate to the assessment activities and competency required for the assessment activities.

It is expected and anticipated that achievement of competence shall be a timely process; e.g that there will not be long gaps between off assessment training and conducting the on-assessment activities or training.

It is expected that, for example an assessor competency matrix (see annex 2 example) for the HD46 capability shall be established, updated and maintained. This will show how the assessor is progressing through the training and development process, for the knowledge, skills and technical understanding, and subsequently the amount of assessment activity, further development, planned competency assessments and outcomes of the assessments.

It is expected that CB's will be able to demonstrate how these processes operate and be used as the focal point for showing assessor competency.

Principle 6

Demonstrating maintenance of assessment (role) competency, continued development and updating of professional, technical and managerial capability to lead and deliver HD46 assessments (roles).

This principle ties in with principle 5 above but focuses on the processes in place within the CB to, not only maintain assessor competency but to provide the development of knowledge, skills and technical understanding appropriate to the principle 1 and 2 roles and identified competence. It is expected that CB's will develop their own systems to meet this principle and will be able to demonstrate how their processes demonstrate that they meet the principle.

Principle 7

Demonstrating effective deployment of appropriately qualified and competent personnel to undertake HD46 activities and roles.

It is expected that CB's will need to provide their own evidence of how this requirement is met, e.g by coding methods, availability of assessors, location of assessors relative to the assessments being carried out.

CB's may choose to explain this in writing if they so desire.

Principle 8

Demonstrating achievement of consistent standards of competency appropriate to the assessment (role) activities and competency required for the assessment (role) activities.

This principle is concerned, not with the individual's competence, but with how the CB ensures consistency of competence in those carrying out their roles. This will be both for the activities carried out by the individual e.g does an assessor's competence degrade at different times of the week, and consistency of competence between different people carrying out the same role, i.e. the skills, knowledge and technical understanding demonstrated by one assessor should within defined limits be the same as another.

It is expected that CB's will need to provide their own evidence of how this requirement is met, e.g by use of one Technical Reviewer carrying out competency reviews, or structuring assessor review documentation which enables consistent assessment criteria

Principle 9

Demonstrating that the assessor (role holder) considers and complies with assessed organizations and the CB's health and safety requirements and any other statutory obligations place on the assessor (role holder)

This principle ensures that the CB does not ignore the wider aspects of competency. It is expected that the CB will, when considering skills, knowledge and technical understanding, considers competency requirements in relation to knowledge of contractual arrangements with the client, confidentiality, data protection, the CB's and the assessed organisation H & S requirements and other obligations that have been identified when applying principles 1 and 2.

It is expected that CB's will provide their own evidence of how this requirement is met, i.e by showing in the Principle 1 and 2 study that they have considered these areas and identified applicable skills

Completing the Iteration – Returning to Principle 1 and 2

The review of processes and activities originally undertaken for Principles 1 and 2 is not a once and for all activity. Changes to HD46, learning from the conduct of assessments, changes in technical requirements are some of the drivers which will make it necessary to review the original decisions on assessor (role) competency. It is expected that CB's will be able to demonstrate that they have periodically, as a result of for example drivers detailed above, reviewed their principle 1 and 2 decisions, and re-defined the competencies required.

Part 2

Assessment and Registration Guidance

This part provides guidance to CB's on assessment related activities and on the registration process.

Validation and Verification:

The scheme has been designed and incorporates the principle of management system validation and management system verification.

A validated management system is one where the organisation can demonstrate through the assessment process that they have all the systems and processes in place to deliver the "Design Product". This allows an organisation to be assessed and as a result demonstrate that they have the design capability, even though they have not been awarded a project requiring them to produce an actual "Design Product"

The organisation can be issued a Registration Certificate which states that their management system has been validated and has the capability to produce a "design product"

Once the organisation has undertaken a project and produced the "design product" then the management system can be verified using the evidence from the project and the output from the design process to verify that their management system works and produces a "design product" that meets the requirements of HD46.

The organisation would then be issued with a Registration Certificate which states that they operate a validated management system meeting the requirements of HD46.

Requirement to up-rate the validated system to a verified system following completion of the first project which results in an HD 46 "design product"

It shall be a requirement of the validation assessment that verification of the system takes place following completion of the first HD46 "design product".

Scopes of Registration:

Scopes of Registration shall describe the Appendix D design subject areas for which the designer has demonstrated design skills and capability, e.g approved for design activities which include vehicle safety fencing schemes, earth works and geotechnical processes.

Assessment Durations:

UKAS has accepted that the assessment duration guidelines are not appropriate to assessment against the requirements of HD 46.

There are a number of factors which impact on a design management system :

The type of “design product”
Number of the organisations personnel involved in producing the “design product”
The number of sub contractors contributing to the “design product”
The value of the “design product” project e.g £30, 000 feasibility study to put a cutting through a hillside against a design project for a £M10 road widening scheme.
The diversity of design project activities and subject areas.
The number and diversity of locations that require assessment effort.

Risk and Complexity also has to be factored in.

Guidance on assessment durations will be inserted after further consideration

Initial Assessment Process

The Certification Body shall demonstrate that they undertake the initial assessments in two phases

Phase one shall ensure that the designers scoping is correct, assess that the Competency Management System processes are in place and that it has been applied to produce appropriate output documents and assess that the quality planning process has been applied and quality plans have been produced.

Phase two shall be the formal assessment which shall include technical and expert assessment of Appendix D Areas where they are critical to the design output

It is expected that the phase one assessment will be carried out by the assessor who will be the team leader for Phase 2 assessment.

Annex 1:

EXTRACTED FROM HD46- APPENDIX C GUIDANCE ON USE OF COMPETENCE MANAGEMENT SYSTEMS

This standard [HD46] does not define requirements for the structure or contents of Competence Management Systems. However, projects ordered by the Overseeing Organisation require Designers to develop and operate such systems.

As part of the Competence Management System, Designers are required to:

[Principle 1] - demonstrate the identification of activities and the competencies required for these activities;

[Principle 2] - ensure that personnel used on the Overseeing Organisation's projects are competent to undertake the duties that will be assigned to them;

[Principle 3] - demonstrate the methods used for the recruitment, training, development, monitoring and assessment of competent resources;

[Principle 4] - evaluate the effectiveness of training and develop accordingly;

[Principle 5] - undertake assessments of competency regularly at intervals appropriate to the specific task;

[Principle 6] - demonstrate the maintenance and development of professional, technical and managerial capability;

[Principle 7] - ensure the effective deployment of appropriately qualified staff;

[Principle 8] - ensure that designers achieve consistent standards of competence appropriate to their work activities; and

[Principle 9] - ensure that the particular safety requirements of the customer and statute are met.

Figure C/1 is a flowchart showing one of the processes from a Competence Management System, which indicates how the above requirements are linked in order to ensure the use of competent resources.

An example of how to assess competence is included in the competency matrices on the following pages. These are generic and show the types of information required to assess competence (qualifications, skills, knowledge, understanding, experience, etc).

These matrices are intended to be specific to a Design Subject Area and Competency Area/Discipline. Details of the skills, knowledge and understanding requirements are given in Appendix D and the levels of experience and training are given in Appendix E.

Competency Management System Flow Diagram extracted from HD46

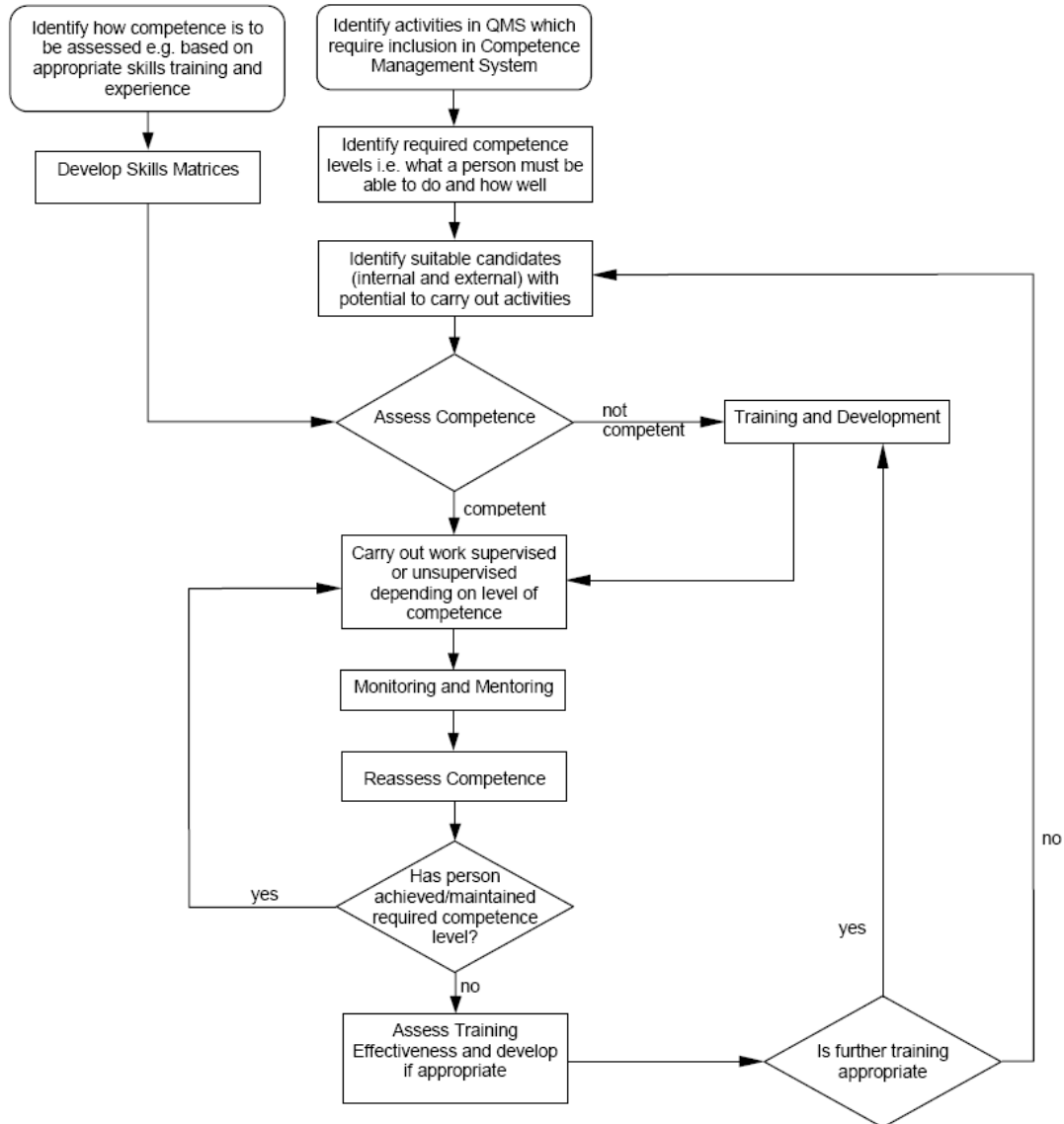


Figure C/1: Competence: Development and Assessment

Example of a Competency Matrix for use by an HD46 CB

Title of Role :							
Activities undertaken:							
Person(s) assigned :							
	Method of Assessment	Accepted level of capability	Competency Assessment Date	Experience to match requirement	Assessed level of capability	Development Needs	Competency Re-assessment date
Qualifications							
Skills							
Knowledge							
Technical Understanding							
Assessment Activity							
Continuing Development Requirements							

Annex 3 – Technical Understanding – Indicative Capability Requirements

Role	Competency Area/ Discipline (Based on HD46 Appendix D)	Indicative Assessor Technical Competency Requirements	Examples of Experience
HD46 Assessor	Basic	Familiar through assessment experience with highway construction legislation, HA specs and standards, and contract specs.	
	Health and Safety	Familiar with HA Highway Construction H & S requirements	
	Environmental Design, Assessment and Management	Broad technical understanding of Environmental Impacts on Highway Construction	
	General	Broad technical understanding of HA documents referred to in Appendix E under General Heading	
	Traffic Management and Vehicle Recovery	Broad technical understanding of HA Traffic Management Requirements and NHSS Scheme(s) 12 documents	
	Fencing and Vehicle Restraint Systems	Broad technical understanding of HA Traffic Management Requirements and NHSS Scheme(s) 2, 4, 5 documents	
	Drainage	Broad technical understanding of Drainage design and construction	
	Earthworks and Geotechnical	Broad technical understanding of geology earthworks, earth re-enforcement, floodplains, foundations	
	Pavement Design and Pavement Maintenance	Broad technical understanding of NHSS Scheme(s) 13, 14, 15, 16	
	Highway Features, inc Kerbs, Footways and Paved Areas	Broad technical understanding of Kerbing construction, footpath design, construction and maintenance including paving	
	Traffic Signals and Control Equipment, Traffic Signs and Road Markings, Road Lighting	Broad technical understanding of HA Traffic signing design and installation standards, loop detectors, skid resistance, Highway Electrics installation, including NHSS Scheme(s) 6, 89b10, 9, 7 and 19 (when issued)	
	Motorway Communications	Broad Technical Understanding of HA motorway communications equipment design standards, use and installation	

	Piling and Embedded Retaining Walls	Broad technical knowledge of piling and retaining wall design and construction	
	Concrete	Broad technical knowledge of concrete technology and use	
	Steel Work	Broad technical knowledge of steel framework construction and loading factors, assessment of bridges and steel structures, protective coatings	
	Protective Systems Waterproofing for Concrete Structures	Broad technical knowledge of corrosion protection on steelwork, and concrete structures, and waterproofing of concrete structures	
	Bridge Bearings, Expansion Joints and Sealing Gaps	Broad technical understanding of bridge construction and jointing	
	Brick, Block and Stonework	Broad technical understanding of constructional techniques using brick, block and stone	
	Tunnels, Moveable Bridge, Bridge Access Gantries	Broad technical understanding of the HA technical requirements for design of road tunnels and moveable bridges, and associated communications systems	
	Highway Structures Design, Inspection, Repair and Maintenance	Broad technical understanding of HA design, inspection, maintenance and repair standards for Highway structures	
	Geodetic Surveys	Broad technical understanding of geodetic surveys and topographical surveys	
	Highway Alignment	Broad technical understanding of design standards for road geometry including new roads, link roads, and road improvements, trunking schemes, junction design, and safety barrier works	
	Highway Junction Design	Broad technical understanding of highway junction design	
	Traffic Surveys and Appraisal	Broad technical understanding of traffic appraisal and assessment schemes including traffic surveys, variable speed measurement, road lighting surveys, traffic capacity surveys, road wear characteristics	

	Assessment of Road Schemes	Broad technical understanding of methods and techniques for assessment of road schemes	
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