1. **INTRODUCTION**

1.1 Under regulation 47 of the Dangerous Goods (General) Regulations (Cap. 295B), no person shall prepare any charge for blasting or fire any charge unless in possession of a valid mine blasting certificate (MBC) issued under regulation 22 of the Mines (Safety) Regulations (Cap. 285B), or is otherwise authorized by the Authority.

1.2 This practice note provides information on:

(a) the requirements to obtain an MBC or authorization to use explosives;
(b) recognition of overseas qualifications;
(c) renewal and endorsement of an existing MBC; and
(d) authorization to undertake special types of blasting work.

1.3 There are two routes for a person to obtain an MBC qualification: Structured Training (Section 4) and Apprenticeship (Section 5).

1.4 A copy of all forms related to this practice note can be obtained from the CEDD website: [http://www.cedd.gov.hk/eng/forms/mines/index.html](http://www.cedd.gov.hk/eng/forms/mines/index.html)

1.5 Any feedback on the contents of this practice note should be directed to the Chief Geotechnical Engineer/Mines, GEO, CEDD.

2. **RELATED DOCUMENTS**

2.1 Dangerous Goods Ordinance (DGO), Cap. 295

2.2 Dangerous Goods (General) Regulations (DG(G)R), Cap. 295B

2.3 Mines (Safety) Regulations (M(S)R), Cap. 285B


3. GENERAL

3.1 Role of Superintendent of Mines

3.1.1 Under the M(S)R, the Superintendent of Mines (SoM), who is also the Chief Geotechnical Engineer/Mines, is responsible for issuing MBCs. The SoM, under delegated authority from the Commissioner of Mines, is also responsible for issuing authorization under regulation 47 of the DG(G)R for a person to prepare any charge for blasting or fire any charge. The term “SoM” in this note generally refers to the regulatory authority for issuing an MBC or authorization.

3.2 Security Check

3.2.1 All applicants for an MBC, including renewal of an existing certificate, or authorization to use explosives, must complete and submit a Personal Data Authorization Form (MIN SC1). The SoM may waive this requirement for overseas shot firers, who do not hold an MBC, applying for short-term authorization to use explosives under Section 8. Mines Division will submit the completed form to the Hong Kong Police Force to check the criminal record of the applicant. The SoM will use the information obtained from the Police to assess the security risk of the applicant in relation to handling explosives.

3.3 Prevention of Bribery

3.3.1 All applicants for an MBC, including renewal of an existing certificate, or authorization to use explosives, must complete and submit form Min/qa/f17 to confirm that they understand their MBC/authorization will be revoked if they are found guilty of an offence under the Prevention of Bribery Ordinance (Cap. 201).
4. APPLICATION FOR A MINE BLASTING CERTIFICATE THROUGH STRUCTURED TRAINING

4.1 Structured training leading to an MBC requires a trainee to complete satisfactorily:

(a) a shot firer training course (to be completed within 12 months prior to starting field training, otherwise the applicant must sit a written examination (para. 5.7);
(b) an application for authorization to use explosives;
(c) field training; and
(d) a practical field test.

4.2 The shot firer training course must:

(a) cover the topics listed in the MBC Examination Syllabus in Annex A (normally about 30 hours’ training);
(b) involve an examination to confirm that the trainee has attained the required standard before a course certificate is awarded; and
(c) be endorsed by the SoM prior to starting.

4.3 Before starting field training, a trainee must:

(a) apply to the SoM for authorization under regulation 47 of the DG(G)R to use explosives using form MIN f13-e;
(b) submit a Personal Data Authorization Form MIN SC1 (para. 3.2.1);
(c) provide details of the blasting site where field training is to be obtained, including confirmation from the blasting permit holder that the trainee will be allowed to work under the supervision of a trainer (para. 5.2 to 5.4) at that site;
(d) provide an outline of the training schedule, which has been agreed with the trainer and the blasting permit holder of the licensed blasting site; and
(e) attend an interview with the SoM.

4.4 At the interview with the SoM, the trainee must demonstrate adequate knowledge of the safety and security of explosives in storage, transport and use, and the liabilities and offences under the DGO and its subsidiary legislation. If the trainee cannot demonstrate adequate knowledge to the satisfaction of the SoM during interview, the trainee may be asked to take a written examination before being interviewed again.

4.5 Authorization to use explosives, once issued, will allow the trainee to prepare any charge for blasting or fire any charge under the supervision of a trainer at a designated site.
4.6 A trainee is expected to obtain 6 months relevant field training and provide evidence to demonstrate significant direct involvement in preparing, reviewing, checking and executing at least 12 ‘training’ blasts before making an application to the SoM for a practical field test. For each training blast, the applicant must complete a training log sheet (MIN f19). The log sheets must be completed immediately after the relevant blast and be available for inspection upon request by a Mines officer. The SoM may take appropriate consideration of a trainee’s prior relevant working experience in handling explosives and blasting operations when assessing the duration of field training. When ready for the practical field test, the trainee must submit to the SoM an Application for a Mine Blasting Certificate (Form I), in duplicate, and a Training and Experience Certification Form – Structured Training (MIN f14-e).

4.7 The trainee must make arrangements with the blasting permit holder of a licensed blasting site for a practical field test, and agree with the SoM a date when a Mines officer can assess the test. During the practical field test, the trainee must demonstrate competence in discharging the duties and responsibilities of a shot firer, including preparing charges, loading and connection of charges, complying with blasting permit conditions, implementing precautionary and protective measures, firing the charges, and checking the blast area after firing. A checklist showing the items to be assessed during the practical field test is given in Annex B. The trainee must achieve a pass in all aspects of the test.

4.8 Upon satisfactory completion of the practical field test, the trainee will be requested to attend an interview with the SoM. Subject to the trainee proving to the satisfaction of the SoM that they are competent to take charge of blasting operations, the SoM will issue an MBC to an applicant within 3 working days after the interview. The MBC will show the specific category for blasting (surface or underground) and the type of initiation system (normally electric and non-electric) that the holder is qualified to use. The MBC is valid for 3 years from the date of issue.

5. APPLICATION FOR A MINE BLASTING CERTIFICATE BY APPRENTICESHIP

5.1 Apprenticeship training leading to an MBC requires the trainee to complete satisfactorily:

(a) a minimum period of training as an apprentice under the supervision of a trainer;
(b) a written examination;
(c) an interview with the SoM; and
(d) a practical field test.
5.2 Before starting an apprenticeship, the trainee must notify the SoM in writing of the commencement date of training under the supervision of a trainer on a blasting site. The trainer must be a registered shot firer at that site. An outline of the training schedule, which has been agreed with the supervising registered shot firer and the blasting permit holder of the licensed blasting site, must be submitted to the SoM. During the training period, Mines officers may conduct random checks on the adequacy and progress of training.

5.3 The trainer must satisfy one of the following requirements:

(a) hold a valid MBC with at least 5 years’ working experience as a shot firer on blasting sites, or
(b) be recognized by a government authority as a competent trainer, or
(c) be endorsed by an explosives manufacturer as a competent trainer.

5.4 The qualifications of the trainer must be accepted by the SoM and must be relevant to the category of blasting and the type of initiation system for which the trainee is being trained.

5.5 A trainee must complete 12 months on site training and have observed at least 40 blasts before making an application to the SoM for an MBC. The required period of training can be accumulated over a period of not more than 3 years.

5.6 After completing the period of training, a trainee may apply to sit a written examination by submitting to the SoM an Application for a Mine Blasting Certificate (Form I), in duplicate, together with the following documents:

(a) detailed personal notes on relevant topics of the Mine Blasting Certificate Examination Syllabus (Annex A) prepared during the training period;
(b) training log sheets (MIN f19) for each blast the trainee participated in and observed during the training period;
(c) a Training and Experience Certification Form – Apprenticeship Training (MIN f15-e); and
(d) a Personal Data Authorization Form (MIN SC1).

The detailed notes and training log sheets must include key elements of the training, e.g. blast design, preparation and loading of charges, connecting charges to delay sequence, protective measures, site clearance before firing, handling of misfires and contingency measures, checking the blast area and observing the blast results after firing. The log sheets must be completed immediately after the relevant blast and be available for inspection upon request by a Mines officer.
5.7 The time allowed for the written examination is 3 hours. The examination paper consists of Part A, multiple-choice questions, and Part B, short questions. A trainee must pass both parts of the examination in a single sitting. The pass mark for each part is 80%.

5.8 On passing the written examination, the trainee will be invited to attend an interview with the SoM. At the interview, the trainee must demonstrate adequate knowledge of the duties and responsibilities of a shot firer, including knowledge of the safety and security of explosives in storage, transport and use, and the liabilities and offences under the DGO and its subsidiary legislation.

5.9 After the trainee has successfully passed the interview and completed form Min/qa/f17, the SoM will issue authorization to the trainee to conduct a practical field test under the supervision of the trainer at a licensed blasting site.

5.10 The procedures for arranging a practical field test, assessment and issue of the MBC certificate are same as those under para. 4.7 and 4.8.

6. APPLICATION FOR RENEWAL OF A MINE BLASTING CERTIFICATE

6.1 Under regulation 22(5)(b) of the M(S)R, MBC holders may apply to the SoM to renew their MBC for a period of 3 years.

6.2 An MBC holder should apply for renewal at least one month before the current MBC expires. The applicant must comply with the following requirements:

(a) submit, together with a copy of the current MBC, an Application for Renewal of Mine Blasting Certificate (MIN f4) and a Personal Data Authorization Form (MIN SC1); and

(b) pass a written examination, attend an interview with the SoM and complete form Min/qa/f17.

The scope of the written examination and the interview will be the same as that for new applicants under para. 5.7 and 5.8. If the applicant has satisfactorily completed a shot firer training course (para. 4.2) or a relevant refresher course endorsed by the SoM within 12 months, the written examination can be waived.

6.3 The procedures for issue of the MBC are the same as para. 4.8, albeit that the applicant is not required to undertake a practical field test.
6.4 If an MBC holder fails to make a renewal application within one year from the expiry date of their existing MBC, a renewal application will be treated as a new application for an MBC under Section 4. Notwithstanding, the applicant may attend a refresher training course endorsed by the SoM, rather than the full training course for new shot firers, and the period of structured training required under para. 4.6 may be reduced, subject to agreement with the SoM, to take due account of the applicant’s previous experience. The holder of an expired MBC must not undertake any duties or activities as a shot firer.

7. APPLICATION FOR ENDORSEMENT TO A MINE BLASTING CERTIFICATE

7.1 Under regulation 22(6) of M(S)R, an MBC holder can apply to the SoM for an endorsement to an MBC.

7.2 An MBC holder with a surface blasting or underground blasting qualification only, can apply for an endorsement to cover another category of blasting. The applicant must:

(a) submit a letter to the SoM requesting the endorsement;
(b) attend a shot firer training course (para. 4.2) or sit a written examination (para. 5.7);
(c) provide details of the blasting site where field training is to be obtained, including confirmation from the blasting permit holder that the applicant will be allowed to work under the supervision of a trainer (para. 5.2 to 5.4) at that site;
(d) undertake field training (the training period should normally involve a minimum of 12 blasts);
(e) submit the relevant training records using form MIN f19; and
(f) attend an interview with the SoM (para. 5.8).

7.3 It is normal practice to include an endorsement for “electrical shotfiring equipment” to cover the use of electric detonators in the initial application for an MBC on the basis that an electric detonator, in combination with non-electric detonators, is commonly use to initiate a blast in Hong Kong.

7.4 Endorsement to use different brands of non-electric detonator, which are essentially the same in the way they are used, is not required. However, the MBC holder is required to provide the SoM with the training documentation or certificate to prove competence in handling the specific brand of non-electric detonator to be used on a site before being accepted to be the registered shot firer, if such information is not already available on the SoM’s record.
7.5 The MBC qualification to use “electrical shotfiring equipment” is deemed not to include the use of electronic detonators unless specified. An endorsement to use a specific electronic detonator system is not required, but the MBC holder is required to provide the SoM with a certificate issued by the manufacturer of the specific system confirming that the MBC holder is competent to use the system. The SoM, once satisfied with the MBC holder’s records of training and experience, will note on the MBC, against the endorsement to use “electrical shotfiring equipment”, that it also covers the specific electronic shotfiring system.

7.6 The holder of a valid MBC does not require authorization under regulation 47 of the DG(G)R to undertake practical field training to obtain an endorsement to an existing MBC to cover another category of blasting or the use of a different type of detonating system (e.g. electronic detonators).

8. AUTHORIZATION FOR SPECIAL TYPE OF BLASTING WORK

8.1 The SoM may issue an authorization under regulation 47 of the DG(G)R to a person to carry out a special type of blasting work, for example:

- demonstration or use of new explosives or initiation systems
- demolition of structures with explosives
- destruction of deteriorated explosives
- submarine blasting.

An applicant for the authorization must satisfy the SoM by producing documentary proof, e.g. relevant certification by a government authority or an explosives manufacturer, as appropriate, to show that the applicant possesses sufficient relevant knowledge and experience, and is fully competent to perform the special type of blasting work. The SoM will interview the applicant after verifying the applicant’s qualifications and experience. If necessary, the applicant will be asked to take a written examination, which will be similar to that described in para. 5.7.

9. RECOGNITION OF QUALIFICATION FROM ANOTHER JURISDICTION

9.1 If a person holds a valid shot firer certificate/permit issued under another jurisdiction, the person may apply in writing directly to the SoM for an MBC. The applicant must submit:

(a) copies of documents, such as relevant licences/permits, certifying that the applicant is a qualified shot firer in another jurisdiction; and
(b) certified statements on past blasting experience.
Provided the SoM is satisfied that the applicant has the relevant experience to practice in Hong Kong, the applicant will need to take a written examination on local requirements and practices, before being interviewed by the SoM, similar to that described in para. 5.7 and 5.8.

10. **RE-EXAMINATION OF APPLICANT**

10.1 If an applicant fails a written examination, interview or practical field test, the applicant will be notified in writing the areas of deficiency. The applicant should take appropriate action to address these deficiencies before applying to retake the examination.

11. **ENQUIRIES ON ISSUE OF AN MBC OR AUTHORIZATION TO USE EXPLOSIVES**

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<th>Telephone No.</th>
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<td>Chief Explosives Officer 2716 8680</td>
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(Raymond W M Cheung)
for Commissioner of Mines
Annex A

Mine Blasting Certificate (MBC)
Examination Syllabus

The written examination covers the following topics:

1. Explosives, detonators and initiation systems
   - types and properties of explosives
   - types of detonators
   - connection and testing of firing circuits

2. Basic rock blasting principles and theory
   - nature of detonation
   - shock wave propagation
   - principles of rock breakage by explosives

3. Drilling operation and site inspection
   - inspection of the blast face
   - setting up and alignment of drill holes
   - checking and measuring of drill holes
   - recognition and recording of relevant information from drill holes (e.g. faults, weathering zone, change of strata, etc.)

4. Blast design and charge calculation
   (i) For MBC covering surface blasting
       - blasting parameters (e.g. bench height, blast hole angle, depth and diameter, burden, spacing, sub-drill, charging length, stemming, drilling patterns, delay firing sequence, etc.)
       - charge calculation (e.g. charge weight per delay, powder factor, etc.)
       - controlled blasting (e.g. pre-splitting, smooth blasting, etc.)

   (ii) For MBC covering underground blasting
       - blasting parameters (e.g. blast hole diameter, depth, spacing, charging length, stemming, tunnel face area, drilling patterns, delay firing sequence, etc.)
       - charge calculation (e.g. charge weight per delay, powder factor, etc.)

5. Identification and prevention of risks of flyrock, excessive vibration and air-overpressure
   - flyrock, ground vibration and air-overpressure, causes and effects, compliance monitoring
   - precautionary and protective measures for protection of public against such risks

6. Preparation, loading, firing of charges and destruction of surplus explosives
   - safe handling, loading and firing working practices and procedures
   - examination of blast area after firing
   - documentation of the blast
7. Contingency plan
   - misfire handling and handling of unexploded explosives after a blast
   - charges loaded in blast holes but cannot be discharged on the same day
   - other possible situations (e.g. thunderstorm, heavy rainstorm, etc.)

8. Ordinance and Regulations
   - requirements of DGO and its subsidiary regulations for the manufacture, storage, conveyance and use of explosives, and penalties for offences, and duties and responsibilities of a shot firer and other related site personnel
   - the United Nations classification system of explosives
   - requirements for packing, marking, labelling, and placarding
   - safe transport of explosives and requirements for approved vehicles
   - Mode A Store for storage of explosives, its safety and security

- End -
Annex B

Checklist for
Key Items to be Assessed in Practical Field Test for an MBC

1. Examination of free face and area of the blast
2. Checking of drilling pattern against blasting design
3. Marking up of holes/delay pattern
4. Measuring of blastholes
   (checking of hole size, spacing, depths and burden)
5. Preparing of a primer
6. Loading of explosives
   (in particular front row burden control for surface blasting, and stemming control)
7. Hook-up of detonators
8. Implementation of evacuation procedure, precautionary and protective measures
9. Firing of charges and checking to be carried out before firing
10. Checking the blast area after firing and handling of misfires and unexploded explosives
11. Destruction of spare detonators (if any)
12. Verification of explosives delivered to a site

- End -