United Kingdom Civil Aviation Authority
Safety Regulation Group
AIR TRAFFIC SERVICES STANDARDS DEPARTMENT

HONG KONG

DECEMBER 2000 REVIEW
ATS STANDARDS DEPARTMENT REVIEW
REPORT

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Reviewed by: ....
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ATSSD (Central)

1   HONG KONG ATC REPORT

1.1   Introduction

This report was compiled by the Air Traffic Services Standards Department (ATSSD) of the United Kingdom Civil Aviation Authority's Safety Regulation Group. It contains the findings of a review of the Air Traffic Control Unit at the Chek Lap Kok International Airport and Area Control Centre, conducted at the request of the Director of the Hong Kong Civil Aviation Department. The review team from the United Kingdom comprised Mr J Dancer, Head of ATSSD, Mr J Dennis, Regional Manager of Air Traffic Services Central Region and Mr R Baker, Head of ATS Licensing Policy.

2   REVIEW PROCEDURES

2.1   Review Process

2.1.1   The scope of the review included High Level Management of Safety, ATC Systems, Training and Licensing, Equipment, Management and Administration and Manning. The review was conducted by examination of documentation, interviews with staff and direct observation of ATC operations. A number of documents, including the Manual of Air Traffic Services, the Hong Kong Aeronautical Information Publication and training and operational documents, were sent to the UK and were subject to rigorous examination prior to the on site review.

2.1.2   The review team was given unrestricted access to all staff, documents and facilities. The team received full co-operation from all the staff, who were very open and forthcoming in interviews and less formal discussions.

2.2   Pre-Review Planning

2.2.1   The review team carried out pre-review planning to define:

a)   the review objectives;

b)   the composition of the review team, its roles and the areas of responsibility of its members;

c)   the scope of the review including detailed topic areas to be considered, such as systems, facilities, management groups and relevant documentation;

d)   the on site review schedule.

2.2.2   Prior to the on site review, documents with the following titles were provided to the review team:

a)   Manual of Air Traffic Control

b)   Aeronautical Information Publication

c)   ATC Systems and Equipment in Hong Kong International Airport

d)   Part "A" Conversion Training

e)   Parallel Runway Operations ADC Conversion Training

f)   Parallel Runway Orientation (Approach Stream)

g)   Approach Stream Training Handbook

h)   "Area Control" Training Handbook

i)   Syllabi for Aerodrome Control Course, Area Control (Procedural) Course and Radar Traffic Director Course

j)   Training Unit, Air Traffic Management Division

2.2.3   These documents were reviewed individually by all the review team members and were the subject of a number of meetings of the review team and other specialist UK CAA staff members.

2.3   Conduct of On-site Review

2.3.1   On the 4th of December Mr J Dancer gave an introductory presentation to Chek Lap Kok (CLK) Management and Staff to introduce the Review Team members, give an overview of the activities and responsibilities of the UK CAA's Safety Regulation Group and in particular the Air Traffic Services Standards Department, and to indicate the scope of the review and how it would be conducted.

2.4   The following topic areas were selected for review:

2.4.1   Review Area 1: High Level Management of Safety

> Definition and scope of the Unit's safety responsibilities
> Top down delegated responsibilities;
> Overview of safety management system for entire organisation, local and corporate;
> Interface arrangements, internal Engineering/Air Traffic Control, internal and external, system control;
> Safety measurement and trend analysis;
> Consistency of analysis;
> References to other detailed safety management documents;
> Organisation chart, responsibilities and job descriptions;
> Accident, incident and occurrence investigation reporting and follow up.

2.4.2   Review Area 2: ATC Systems

> Manual of Air Traffic Services;
> Organisation chart, responsibilities and job descriptions;
> Competency objectives and performance figures;
> Measurement of performance (both generally and person-specific) against objectives and performance criteria;
> Emergency procedure training and connectivity of associated agencies, including the aerodrome rescue and fire fighting service and outside agencies;

SIDs and STARs;
Competency checking arrangements;
Documentary Compliance.

2.4.3   Review Area 3: Use of Equipment

Manufacturer's stated safety requirements for ATC related equipment;
Unit's stated safety requirements for the ATC related equipment;
Operational comparison of the safety requirements;
Mitigations supporting use where operational comparison indicates
differences or inadequacies.

2.4.4   Review Area 4: Training

Facilities provided;
Training and instruction techniques, programmes and plans;
Training assessment, examination, checking standards and record keeping;
Selection methods for ATCOs;
Selection methods for instructors.

2.4.5   Review Area 5: Management and Administration

Performance and maintenance of standards, assessment and record keeping;
Selection and training of management grades;
Occurrence reporting, record keeping, trend analysis and remedial action;
Operational supervision;
Temporary Instruction and Supplementary Instruction production including
assessment of hazards;
Documentary amendments, signing off.

2.4.6   Review Area 6: Manning

Organisational structure, staff competencies and rosters;
Working hours, record keeping, position monitoring, working agreements,
staff levels and extraneous duties.

2.4.7   The review team considered all the Review Areas and associated topics. However,
where reference is not made to specific topics, either the documentation or procedure
did not exist or they are covered in the more general comments.

2.5.   Review Findings

2.5.1   High Level Management of Safety

2.5.1.1 The review team concluded that the Management team at Chek Lap Kok (CLK) give
the appropriate priority to safety and this has been adequately demonstrated by the
safe and orderly move from Kai Tak International Airport to CLK. However, the
review team concluded that, although the present operations at CLK are safe, the
existing arrangements for managing safety will not be able to cope with the
anticipated traffic levels and increasing complexity of the air traffic system. The
management structure should be strengthened to introduce a formally documented
Safety Management System (SMS). Although external assistance will be required to
develop an SMS, staff at CLK should be actively involved and trained in the
development, documentation, implementation and operation of an SMS. A Safety

and Quality Section should be introduced, reporting directly to the Air Traffic General Manager (ATGM), to oversee the SMS and to audit the unit's compliance with and ongoing development of the SMS.

2.5.1.2 If the Civil Aviation Department accepts the findings of this review report and introduces SMS as its method of managing safety, it is important that there is stability in the top management positions during its introduction. Although the review team has made no other reference to individuals in this report, they consider it imperative that Mr Norman Lo, the present Air Traffic General Manager, remains in his post for two years or at least until an SMS has been introduced. It was apparent to the review team that Mr Lo already has the necessary general and personnel management skills and knowledge of safety management, including crew and team resource management, to make the changes that will be required if the air traffic services at CLK are to remain safe as traffic levels increase.

2.5.1.3 A single Deputy Air Traffic General Manager (DATGM) should be appointed to support and take over the responsibilities of ATGM when required. A Watch Manager should be appointed to each of the operational ATC watches and these Watch Managers should be an integral part of the management system.

2.5.1.4 The Hong Kong Civil Aviation Department should consider setting up an independent Safety Regulator to monitor and audit the ATC operations of the CLK ATC unit and in particular to audit compliance with and continuing development of its SMS.

2.5.2 ATC Systems

2.5.2.1 The review team considers the ATC facilities at CLK are of the highest order and the manning levels adequate. The location of the airport and its associated limited airspace have restricted its operation, although it is considered that a number of changes could be made to increase efficiency and reduce the number of "go rounds" that are attracting so much negative press comment.

2.5.2.2 One major factor affecting the introduction of new procedures is the lack of any identifiable documented change process, such as would be required by an SMS. Although a systematic approach for procedure evaluation has been adopted, staff have not had the necessary training to enable them to conduct the risk and hazard analysis essential to conduct appropriate simulations.

2.5.3 Use of Equipment

The equipment at CLK is appropriate to the ATC operations and the standby Tower and Area Control Centre provide a high level of back up in event of a catastrophic failure of the Tower or Area Control Centre Equipment. The engineering processes are satisfactory, well managed and adequately documented. ATC engineering forms a vital part of any SMS and the Chief Electronics Engineer responsible for ATC engineering matters should be an integral part of the ATC management team.

2.5.4 Training

2.5.4.1 The recruitment processes should be changed to ensure that the most suitable candidates are available for selection. This may include increasing the academic requirements, adopting more appropriate computer based aptitude testing and

reviewing the remuneration offered in the light of that available in industries competing for trainees of similar calibre.

2.5.4.2 The training section is exceptionally well equipped with simulators and has adequate classroom facilities. However, the training and assessing processes and procedures have not kept pace with the changes that have taken place in other advanced aviation States. The review team noted that the staff in the training section are aware of these shortcomings but lacked the necessary training and therefore staff were slow to develop and implement new training procedures. The training section requires at least two permanent and appropriately trained instructors if the training is to be updated to adequately prepare student air traffic controllers for on the job training and ultimately as rated air traffic controllers in an increasingly busy and complex environment. A more effective feedback mechanism from student controllers should be considered.

2.5.4.3 The administration of the air traffic controller licensing system meets ICAO requirements. The review team was concerned that the method used for rating renewals was not effective and recommends the introduction of a watch centred competence scheme for monitoring the ongoing competence of the operational air traffic controllers.

2.5.4.4 As the traffic levels at CLK increase and the ATC procedures become more complex, controllers will have to specialise in particular rating disciplines if they are to maintain the high level of competence required. It is the SMS procedures that should determine what ongoing experience a controller requires, on any particular sector or operational position, to maintain his competence. For these reasons and those of safety the requirement for controllers to hold all the ratings at CLK must be revoked.

2.5.5   Management and Administration

2.5.5.1 The present management structure and style is not appropriate for a modern busy and complex Tower or Area Control Centre Air Traffic Control Unit. There was insufficient exchange of information and ideas between the operational air traffic controllers and management and it does not place any emphasis on watch centred team resource management. If these matters are not addressed, the review team believes that issues such as controller confidence in, and compliance with, new procedures and controller competence to handle the ever increasing traffic levels will become a significant problem.

2.5.5.2 The present incident investigation process includes an element of apportioning blame to individuals. The management team should focus on retraining and the dissemination of the safety lessons learned from the incident. Initial incident investigation at watch level should be introduced to enable the controller involved to be returned to duty with the minimum delay, subject to any identified need for retraining. The present more extensive internal unit investigation of incidents is satisfactory, but an independent incident investigation unit should be introduced to review internal investigations and where appropriate to conduct independent investigations of more serious incidents. Allocation of a level of risk to the safety of aircraft that are involved in ATC incidents should be devolved to an independent body under the chairmanship of an aviation expert appointed by the Hong Kong Civil Aviation Department.

2.5.6 Manning

2.5.6.1 Manning levels are adequate for the present and immediately predicted traffic levels, but will need to be adjusted in accordance with the requirement of the SMS and team based concept.

2.6 Review Debrief Meetings

2.6.1 The review team debriefed the CLK ATC management team on the afternoon of the 7th of December for the purpose of:

    a)   indicating any major safety concerns;

    b)   presenting any identifiable conclusions and recommendation where appropriate;

    c)   discussing the agreed preparation and delivery of the written Review Report;

    d)   making any other closing comments relating to the initial review findings.

2.6.2 On the morning of the 8th of December Mr Dancer gave the debriefing presentation to a meeting chaired by Mr Albert LAM, the Director of Civil Aviation Department, which included representatives from the Economic Services Bureau. On the afternoon of the 8th of December Mr J Dancer read a prepared press statement to the Economics Committee of the Legislative Council in which he stated that the air traffic control services provided at the Chek Lap Kok International Airport and Area Control Centre were safe.

3 MANAGEMENT DEBRIEF AND LEGISLATIVE COUNCIL STATEMENT

3.1 Introduction

3.1.1 This section contains the slides that were used by Mr J Dancer in his debrief of the Chek Lap Kok ATC management team on the afternoon of the 7th of December and his press statement given before the Legislative Council on the 8th of December.

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REVIEW OF HONG KONG AREA AND AIRPORT AIR TRAFFIC SERVICES
December 2000
Safety Regulation Group UK CAA

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HONG KONG ATS REVIEW
• Thank you for the high level of co-operation we have received.
• Every effort has been made to facilitate our review.
• We consider the present operation is safe.
• No immediate action required, although there are areas which need attention.
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HONG KONG ATS REVIEW

There are four areas which need attention, namely:-

- Management and Organisation.
- Investigation Process
- Training and Competence
- Operations

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HONG KONG ATS REVIEW

Management and Organisation

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Management and Organisation

- Clearly defined Accountabilities and Responsibilities.
- Documented Safety Management System.
- Establish a Safety and Quality Section within the Air Traffic Management Division.
- Establish an independent ATM Safety Regulator.
- Simplify the management structure.

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Management and Organisation

- A formal Safety Management System (SMS) has Policies and Principles (P&P) which define the components of an organisation's SMS.
  - these should be derived from the lessons learned from a wide variety of accidents where *management failures* were cited as a significant contributory cause.

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Management and Organisation

the Policy and Principles could be considered as a hazard checklist for identifying any potential risks of management failures causing or contributing to an accident.
the adoption of an effective formal SMS could be considered as a risk reduction exercise to minimise such failures as far as reasonably practicable.

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Management and Organisation

Common sense is required in interpreting the Policies and Principles for application within an organisation is different, as are their safety cultures.

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Management and Organisation

- A formal SMS needs to be documented to ensure traceability, standards and communication, as a Quality Management System.
- Normal practice is to produce a Safety Management Manual promulgating:-
    - an organisation's SMS P&Ps
    - Senior Managers safety accountabilities
    -

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MANAGEMENT STRUCTURE

General Manager
|
Safety & Quality Manager - |
|
Deputy General Manager
including Personnel & ATC Licensing
|

_____

| | | |
Watch Managers Training Managers Operations Manager Engineering Managers

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HONG KONG ATS REVIEW

INVESTIGATION PROCESS

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Investigation Process

The present system is creating a climate of fear, disrespect and lack of trust. There is a fear of what action is taken in respect of controllers who make an error. The licensing action seems "draconian". A revised procedure for Investigations would need to be documented and published.

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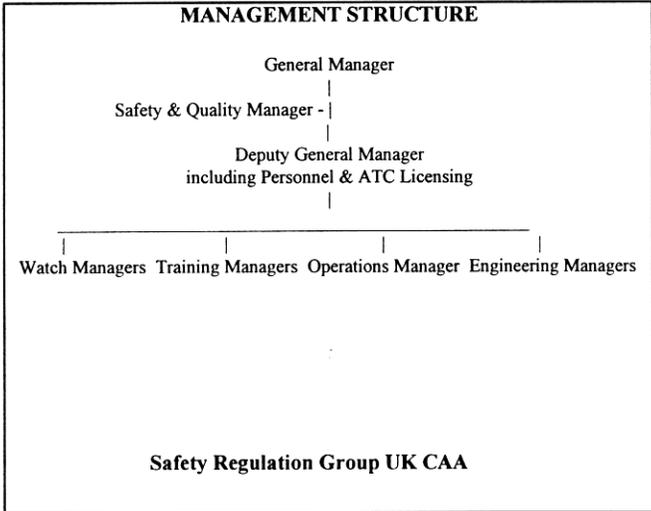
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Investigation Process

- The process should consider:-
    - establishing a quick internal watch led investigation in confidence which assesses the controllers involvement and recommends appropriate ATC Licensing action to ATM GM
    - an early press release on Airproxes and Incidents involving ATC.

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Investigation Process

- ATC Licensing action must be appropriate, with the intention of returning the controller to work as soon as possible.
- Investigation Reports should be discussed with individual controllers before being published and made available to all other operational staff to ensure that lessons can be learned.

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Investigation Process

- Consideration should be given to setting up a small, independent Airprox Assessment Panel
  - it should consist of an independent
  -Chairman retained by the CAD, controllers and pilots
  - the Panel should produce a regular report on Airproxes for "public" release

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Training and Competence

WATCH COMPETENCY ORGANISATION
|
Watch Manager
|
Watch Competency Co-ordinator
ATCO
|
Competency Examiner Competency Examiner Competency Examiner
ATCO   ATCO   ATCO
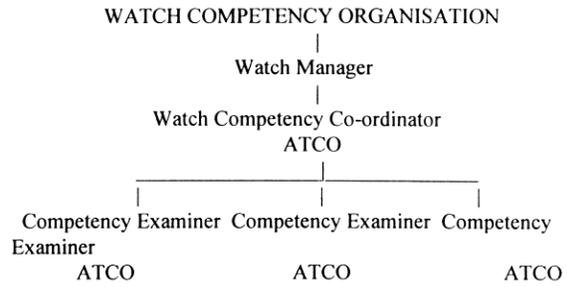
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HONG KONG ATS REVIEW

Training & Competence

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HONG KONG ATS REVIEW

Operations

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Recruitment, Training and Competence

- A review of recruitment qualifications and entry pay scales should be undertaken
- Training requires to be reviewed and structured to reflect modern training and assessment practices
- Courses should be developed "in house"
- Staff should be trained in course development techniques
- A formal feedback procedure from OJTIs

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Operations

- Technical Committees to be established
- China and Macao airspace negotiations
- Review of sectorisation and route structure
- "land after" and "land after departing" procedures

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3.2   Presentation to Legislative Council, Economics Committee on the afternoon of the 8th of December

3.2.1   Firstly I would like to introduce myself and my team. My name is John Dancer and I work for the United Kingdom's Civil Aviation Authority's Safety Regulation Group.

My colleagues are Mr Jeff Dennis who is one of my Regional Managers and Mr Robin Baker who is my Head of Air Traffic Control Licensing Policy.

3.2.2   The Safety Regulation Group is responsible for the Safety Regulation of all the UK's aviation industry. This includes the Safety Regulation of UK airline operators, aircraft maintenance organisations, aircraft manufacturers and personnel licensing. Within this organisation I am the Head of the Air Traffic Services Standards Department which has the responsibility for the Safety Regulation of all the Air Traffic Services in the United Kingdom. My team has expertise in safety regulation and we have all been operational air traffic controllers in the UK.

3.2.3   We have completed our four day review of the Hong Kong ATC facility and are pleased to report that it is our conclusion that the air traffic control operations at Chep Lap Kok (CLK) and its associated airspace are safe.

3.2.4   The Civil Aviation Department and in particular the Air Traffic Control management team are to be congratulated on maintaining a safe operation both during and after the transfer from Kai Tak to CLK.

3.2.5   The resources required by the move and the problems associated with the Y2K issues have fully committed the administrative and operational sections. Now that this situation has stabilised they, quite correctly and responsibly, are turning their attention to reviewing and improving their existing procedures. As part of this process they have invited the UK Civil Aviation Authority's Safety Regulation Group to undertake a totally independent review.

3.2.6   At our opening meeting Mr Albert Lam, the Director Civil Aviation, made it quite clear to us and to the Management and staff at the CLK ATC facility that we were to have unimpeded access to all staff and facilities. We can confirm that we received an exceedingly high level of co-operation from Mr Normal Lo, the Air Traffic General Manager, and from his staff.

3.2.7   We conducted the review in accordance with the procedures and practices that we employ for the regular auditing of ATC units in the United Kingdom. To ensure that the air traffic services management and staff understood how the review was to be conducted we commenced with a formal presentation of the review process. The review considered the management and organisation of the Air Traffic Management Division, Hong Kong Civil Aviation Department, including such areas as ATC incident investigation, training and recruitment.

3.2.8   We have concluded that the present operations are safe. As with any other ATC organisation there are areas which need continuing development to maintain the present level of safety, particularly in the light of the ever increasing traffic levels. In our discussions with the airline operators who fly in and out of CLK it was evident that they were satisfied with the standard of ATC operations. Now that the new airport has been in operation for some time resources can be refocused on these development issues.

3.2.9   As part of this development we see the need for the Hong Kong Civil Aviation Department to make every effort to attract a high calibre of recruit and to provide them with the appropriate training and support to fulfil its future needs for air traffic controllers.

3.2.10 It would be difficult for us not to be aware of the public concern relating to the number of air traffic control incidents reported by the CLK air traffic controllers. We therefore reviewed all the incident reports and conclude that they were mainly technical losses of standard separation which posed no risk to safety. We also concluded that there was no discernible pattern that would indicate problems with the competence of the air traffic controllers or the safety of the ATC system. The Director of Civil Aviation encourages the reporting culture and requires every significant incident to be reported and investigated. In our judgement the rates of air traffic control incidents at CLK are comparable with what could be expected from the ATC operations at similarly sized international airports.

3.2.11 We have every confidence that the management and staff at the CLK ATC facility have the necessary skills and enthusiasm to satisfy any recommendations that we will make in the detailed review report which will be the outcome of this process.

3.2.12 Finally, I would again like to thank Mr Albert Lam, Mr Alex Au, Mr Norman Lo and their staff for their co-operation with my team while we conducted the review.

4 CONCLUSIONS

4.1 Conclusions

4.1.1 Chek Lap Kok International Airport and its associated Area Control Centre have the potential to achieve traffic levels comparable with any other similarly sized international airports. The present ATC operations at CLK are safe; however, if the airport is to remain safe while realising its full potential, management of safety must be approached in a more systematic and justifiable way. It is the conclusion of the review team that this can only be achieved through the introduction of a Safety Management System. If this is to be successful, resources must be made available to enable organisational changes to be made and to ensure that indigenous staff are trained in the appropriate skills and are given the resources to enable them to make the necessary changes. To support this approach to developing a systematic safety regime at CLK, the Hong Kong Civil Aviation Department should introduce an independent safety regulator and take a more active part in incident investigation and follow up action.

5 LIST OF RECOMMENDATIONS

Recommendation 1: A formal Safety Management System should be introduced with supporting management changes and the introduction of a Safety and Quality section.

Recommendation 2: The Civil Aviation Department should consider supporting such a safety initiative by the introduction of an independent safety regulator.

Recommendation 3: The management structure should be simplified to provide one Deputy Air Traffic General Manager (DATGM).

Recommendation 4: An appropriately qualified agency should be used to provide advice and guidance on the production of a documented Safety Management System.

Recommendation 5: Existing procedures should be subject to review to identify potential latent hazards.

Recommendation 6: Watch Managers should be appointed who form an integral part of the ATC management team.

Recommendation 7: The Manual of Air Traffic Control should be reviewed to determine its purpose and role.

Recommendation 8: Consideration should be given to developing separate operational documents for the tower and for approach and area control and including in them the current operational memoranda.

Recommendation 9: Procedures relating to the manual should be fully documented and subject to a recognised document control system.

Recommendation 10: The unit should consider the introduction of "land after" and "land after the departing" procedures.

Recommendation 11: A documented change procedure must be introduced and the staff involved appropriately trained.

Recommendation 12: The ATC operations associated with the Approach, Departure and Co-ordinator positions should be reviewed to produce more equable work loading.

Recommendation 13: SIDs and STARs should be reviewed to ensure a minimum requirement for controller intervention.

Recommendation 14: A full review of the airspace, route structures and associated ATC procedures should be undertaken.

Recommendation 15: The review of the airspace, route structures and associated ATC procedures referred to in Recommendation 14 should include Area operations.

Recommendation 16: The Chief Electronics Engineer who is responsible for the ATC related engineering equipment should be an integral part of the higher ATC management team.

Recommendation 17: The training section requires additional staff if it is to review and restructure its training. In particular, full time instructional staff should be employed to instruct on the early parts of the courses and basic simulator exercises. The Review Team supports the present practice of using OJTIs to instruct on the courses, but would restrict their use to the later, less basic, simulator exercises.

Recommendation 18: Where overseas training is to be used, a member of the training staff should approve the course in respect of its suitability to meet the Hong Kong ATC licensing requirements.

Recommendation 19: The rating training courses should be reviewed and restructured in an objective format by the additional permanent instructors, who should be given the necessary training to accomplish this task in-house.

Recommendation 20: All the courses should be appropriately documented and quality control procedures adopted for maintaining and updating the courses.

Recommendation 21: Formal feed-back mechanisms should be developed to ensure that the training courses continue to prepare students appropriately for on the job training.

Recommendation 22: Tower control and emergency training should be introduced.

Recommendation 23: The present renewal of rating examination system should be replaced by a watch based competence scheme.

Recommendation 24: The Senior Standards Officers should be trained to run examiner courses.

Recommendation 25: The Senior Standards Officers should take on the role of ensuring that the competence scheme is maintaining the standard of air traffic control being provided.

Recommendation 26: The requirement for controllers at CLK to hold all the ratings should be revoked.

Recommendation 27: The development and implementation of new ATC procedures should be addressed through an ATC technical committee.

Recommendation 28: Efforts must be made to change the management and controller attitude to incident investigation from one that emphases punishment to one which views it as a process with positive advantages to safety.

Recommendation 29: The incident investigation process must be changed to ensure that controllers are returned to operational duty as soon as is practicable following an incident.

Recommendation 30: An independent safety regulator with responsibilities to monitor incident investigations and to conduct independent investigations when appropriate should be established.

Recommendation 31: An independent panel should be set up to assess, and to allocate a status to the risk to, the safety of aircraft involved in ATC incidents.

Recommendation 32: The process for grading controllers by their competence should be stopped. Controllers who are not considered competent should not be permitted to provide an air traffic control service.

Recommendation 33: All controllers should be required to control at some time during peak traffic periods.

Recommendation 34: The unit should consider using its simulators to ensure that its controllers have sufficient practice at controlling at peak traffic levels for all runway configurations.

6   DISTRIBUTION LIST

Hong Kong Civil Aviation Department:

Mr Albert Lam, Director of the Hong Kong Civil Aviation Department

United Kingdom Civil Aviation Authority:

Mr Tony Roome, Head of International Services Department

Mr John Dancer, Head of Air Traffic Services Standards Department (ATSSD)

Mr Jeff Dennis, ATSSD Review Team

Mr Robin Baker, ATSSD Review Team

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