Risk Assessment For Fire Safety"

A dissertation submitted in partial fulfillment of the requirements for the award of

Post-Graduate Diploma in Health and Hospital Management

By

Dr. Krupali Kusta Talpankar

International Institute of Health Management Research
New Delhi -110075
April 2011

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Certificate of Approval

The following dissertation titled "**Risk Assessment for safety** " is hereby approved as a certified study in management carried out and presented in a manner satisfactory to warrant its acceptance as a prerequisite for the award of **Post-Graduate Diploma in Health and Hospital Management** for which it has been submitted.

It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation

Name & Signature Name & Signature

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Risk assessment for fire safety at Quality council of India

by

Dr.Krupali Talpankar

Fire in any occupancy has potential to cause harm to people and severe damages to property. Fire safety refers to precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage, alert those in a structure to the presence of a fire in the event one occurs, better enable those threatened by a fire to survive, or to reduce the damage caused by a fire.

National Code for Building has set some requirement for structure of building to be taken in to consideration while construction. State also has its regulation for fire safety for building. To ensure safety of buildings and their occupants, the Building Bye-laws were adopted and duly notified by the Delhi Administration of 23rd June 1983.

This study focuses on the fire safety risk assessment carried out in Institution of Engineers building located at Bahadur Shah Zafar Marg, referred as QCI building which falls under "Educational building" type with a height of 15 metres or less (classification according to National Building Code) .

Study result shows that

Building was constructed in 1927, and as per regulation, building do compliance few standards for structure but maintenance is very poor. Assessment also shows that building premises has low risk as in the event of fire and there is little chance of anyone being placed at risk but deficient in management.

Fire fighting equipment are not to the marked standards, and inadequate for the risks management.

Training of employees regarding fire safety is totally ignored and roles and responsibilities are not defined.

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Internship in Quality Council of India (QCI) under NABH
(National Accreditation Board for Hospitals & Healthcare Provider)

INTRODUCTION:

Quality Council of India (QCI) was set up in 1997 jointly by the Government of India and the Indian Industry represented by the three premier industry associations i.e. Associated Chambers of Commerce and Industry of India (ASSOCHAM), Confederation of Indian Industry (CII) and Federation of Indian Chambers of Commerce and Industry (FICCI), to establish and operate national accreditation structure and promote quality through National Quality Campaign. The Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, is the nodal ministry for QCI.

QCI is also assigned with the task of monitoring and administering the National Quality Campaign and to oversee effective functioning of the National Information and Enquiry Services.

To realize the objective of improving quality competitiveness of Indian products and services, QCI provides strategic direction to the quality movement in the country by establishing recognition of India conformity assessment system at the international level.

Vision:

To be among the world's leading national apex quality facilitation, accreditation and surveillance organizations, to continuously improve the climate, systems, processes and skills for total quality.

Mission:

To help India achieve and sustain total quality and reliability, in all areas of life, work, environment, products and services, at individual, organizational, community and societal levels.

Objectives:

- Establish and maintain an accreditation structure in the country
- Provide right and unbiased information on quality related standards
- Spread quality movement in the country through National Quality Campaign
- Facilitate up gradation of equipments and techniques related to quality
- Represent India's Interest in International forums
- Help establish brand equity of Indian products and services

QCI is governed by a council of 38 members with equal representative of government, industry and consumer. Chairman of QCI is appointed by the Prime Minister's office on recommendation of the government and industry**.** Council is the apex level body responsible for formulating the strategy, general policy, constitution and monitoring of various components of QCI including the accreditation boards with objective to ensure transparent and credible accreditation system. The Council through a Governing Body monitors the progress of activities and appeal mechanisms set by the respective boards.

QCI functions through the executive bodies (boards / committees) that implement the strategy, policy and operational guidelines set by the Quality Council of India with a view to achieve international acceptance and recognition of various components including the accreditation systems.

Each Board has a Chairman nominated by the QCI Chairman. The Boards comprise of representative volunteer group of stakeholders who guide and pursue the activities and progress of the respective Boards.

QCI has established and operates accreditation structure in the area of conformity assessment covering bodies offering services like certification, inspection, testing, calibration and registration. The disciplines presently include management of quality, environment, food safety, health, occupational health and safety.

DIFFERENT ACCREDITATION BOARDS IN QUALITY COUNCIL OF INDIA

Fig 1.1

NABH (National Accreditation Board for Hospitals and Healthcare Providers)

NABH is a constituent board of Quality Council of India, set up to establish and operate accreditation programme for healthcare organizations. The board is structured to cater to much desired needs of the consumers and to set benchmarks for progress of health industry. The board while being supported by all stakeholders including industry, consumers, government, have full functional autonomy in its operation.

Achievements & International Linkages

NABH is an institutional member of the International Society for Quality in Health Care (ISQua). ISQua is an international body which grants approval to Accreditation Bodies in the area of healthcare as mark of equivalence of accreditation program of member countrie. International Society for Quality in Healthcare (ISQua) has accredited “Standards for Hospitals” developed by National Accreditation Board for Hospitals & Healthcare Providers (NABH, India). The approval of ISQua authenticates that NABH standards are in consonance with the

global benchmarks set by ISQua. The hospitals accredited by NABH will have international recognition. This will provide boost to medical tourism.

International Society for Quality in Health Care (ISQua) is an international body which grants approval to Accreditation Bodies in the area of healthcare as mark of equivalence of accreditation program of member countries.

So far hospital standards of only 11 countries viz. Australia , Canada , Egypt , Hong Kong , Ireland , Japan , Jordan , Kyrgyz Republic , South Africa , Taiwan , United Kingdom were accredited by ISQua. India becomes the 12th country to join in this group.

NABH is the founder member of Asian Society for Quality in Healthcare (ASQua) registered in Malaysia.

NABH is a member of International Steering Committee of WHO Collaborating Centre for Patient Safety as a nominee of ISQua Accreditation Council.

NABH STRUCTURE:

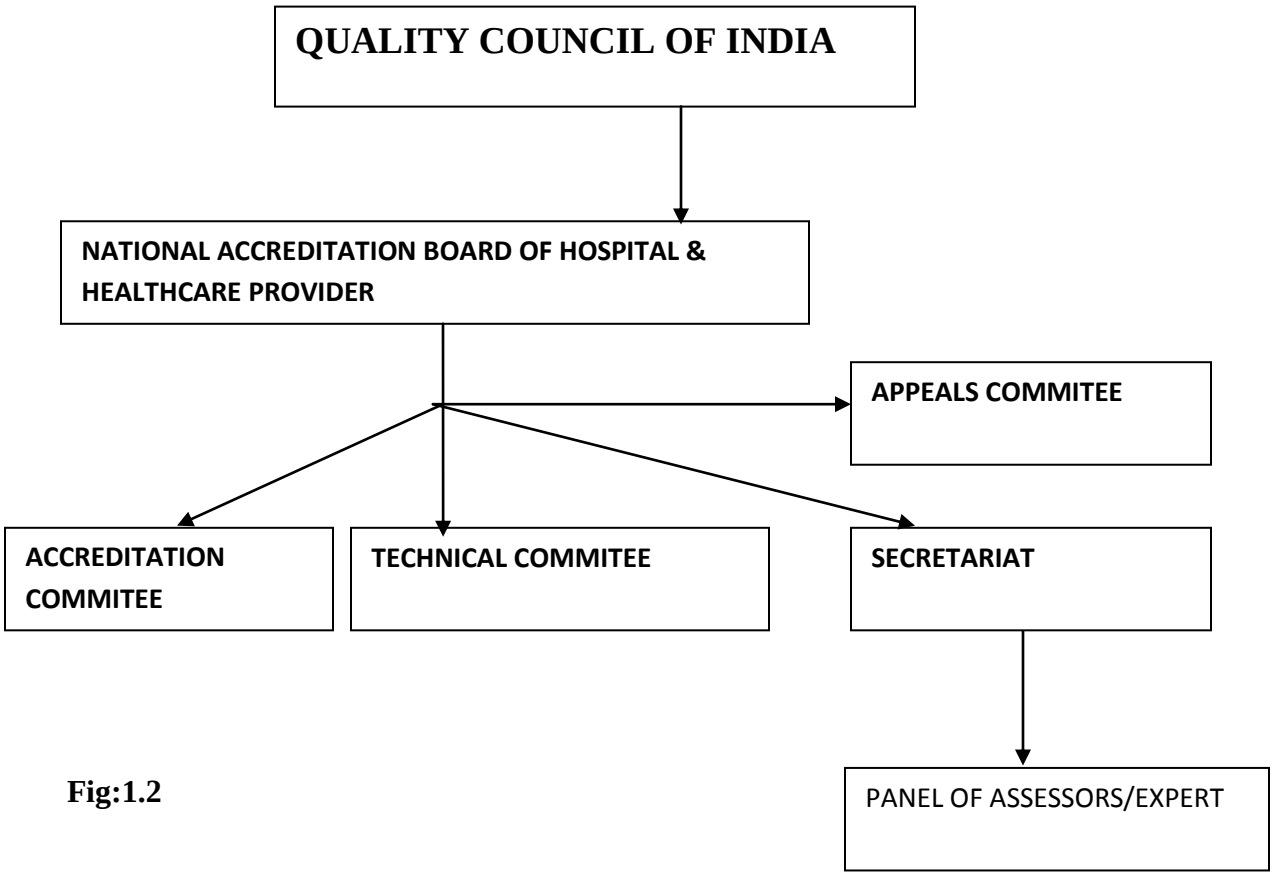


Fig:1.2

Accreditation Committee

The main functions of Accreditation Committee are as follows:

- Recommending to board about grant of accreditation or otherwise based on evaluation of assessment reports & other relevant information.
- Approval of the major changes in the Scope of Accreditation including enhancement and reduction, in respect of accredited hospitals.
- Recommending to the board on launching of new initiatives

Technical Committee

The main functions of Technical Committee are as follows:

- Drafting of accreditation standards and guidance documents
- Periodic review of standards

Appeals Committee

The Appeal Committee addresses appeals made by the hospitals against any adverse decision regarding accreditation taken by the NABH. The adverse decisions may relate to the following:

- refusal to accept an application,
- refusal to proceed with an assessment,
- corrective action requests,
- changes in accreditation scope,
- decisions to deny, suspend or withdraw accreditation, and
- Any other action that impedes the attainment of accreditation.

NABH Secretariat

The Secretariat coordinates the entire activities related to NABH Accreditation to Hospitals and healthcare organizations.

Panel of Assessors and Experts

NABH has a panel of trained and qualified assessors for assessment of hospitals.

- **Principal Assessor**

The Principal Assessor is overall responsible for conducting the pre-assessments and final assessments of the hospitals.

- **Assessors**

NABH has empanelled experts for assessment of hospitals. They are trained by NABH on hospital accreditation and various assessment techniques. The assessors are responsible for evaluating the hospital's compliance with NABH Standards.

NABH Standards:

NABH Standards for hospitals prepared by technical committee contains complete set of standards for evaluation of hospitals for grant of accreditation.

The standards provide framework for quality of care for patients and quality improvement for hospitals. The standards help to build a quality culture at all level and across all the function of hospital. NABH Standards has ten chapters incorporating 100 standards and 514 objective elements.Outline of NABH Standards [1]

Patient Centered Standards

- Access, Assessment and Continuity of Care (AAC)
- Care of Patient (COP)
- Management of Medication (MOM)
- Patient Right and Education (PRE)
- Hospital Infection Control (HIC)

Organization Centered Standards

- Continuous Quality Improvement (CQI)
- Responsibility of Management (ROM)
- Facility Management and Safety (FMS)
- Human Resource Management (HRM)

- Information Management System(IMS)

Assessment Criteria

A hospital willing to be accredited by NABH must ensure the implementation of NABH standards in its organization.

The assessment team will check the implementation of NABH Standards in Organization.The Hospital shall be able to demonstrate to NABH assessment team that all NABH standards, as applicable, are followed

NABH currently provides accreditation to the following:

- Hospitals
- Small Health Care Organisations (SHCOs)
- Blood Banks
- Wellness Centres
- AYUSH (5 sub programs-Ayurveda,Yoga And Unani, Siddha Naturopathy, Homoeopathy
- Medical Imaging Services
- Dental Centres
- Primary Health Center/Community Health Center

PROCESS FOR ACCREDITATION:

Hospital management shall first decide about getting accreditation for its hospital from NABH. It is important for a hospital to make a definite plan of action for obtaining accreditation and nominate a responsible person to co-ordinate all activities related to seeking accreditation. An official nominated should be familiar with existing hospital quality assurance system.

Hospital shall procure a copy of standards from the NABH Secretariat against payment. Further clarification regarding standards if needed taken from NABH Secretariat in person, by post, by e-mail or on telephone. The hospital looking for accreditation shall understand the NABH assessment procedure. The hospitals shall ensure that the standards are implemented in the organization.

The hospitals can download the application form for NABH Accreditation from the web-site. The applicant hospital must have conducted self-assessment against NABH standards at least 3 months before submission of application and must ensure that it complies with NABH Standards. Hospital should fill the self assessment tool kit, send it NABH Secretariat with all department quality manual.

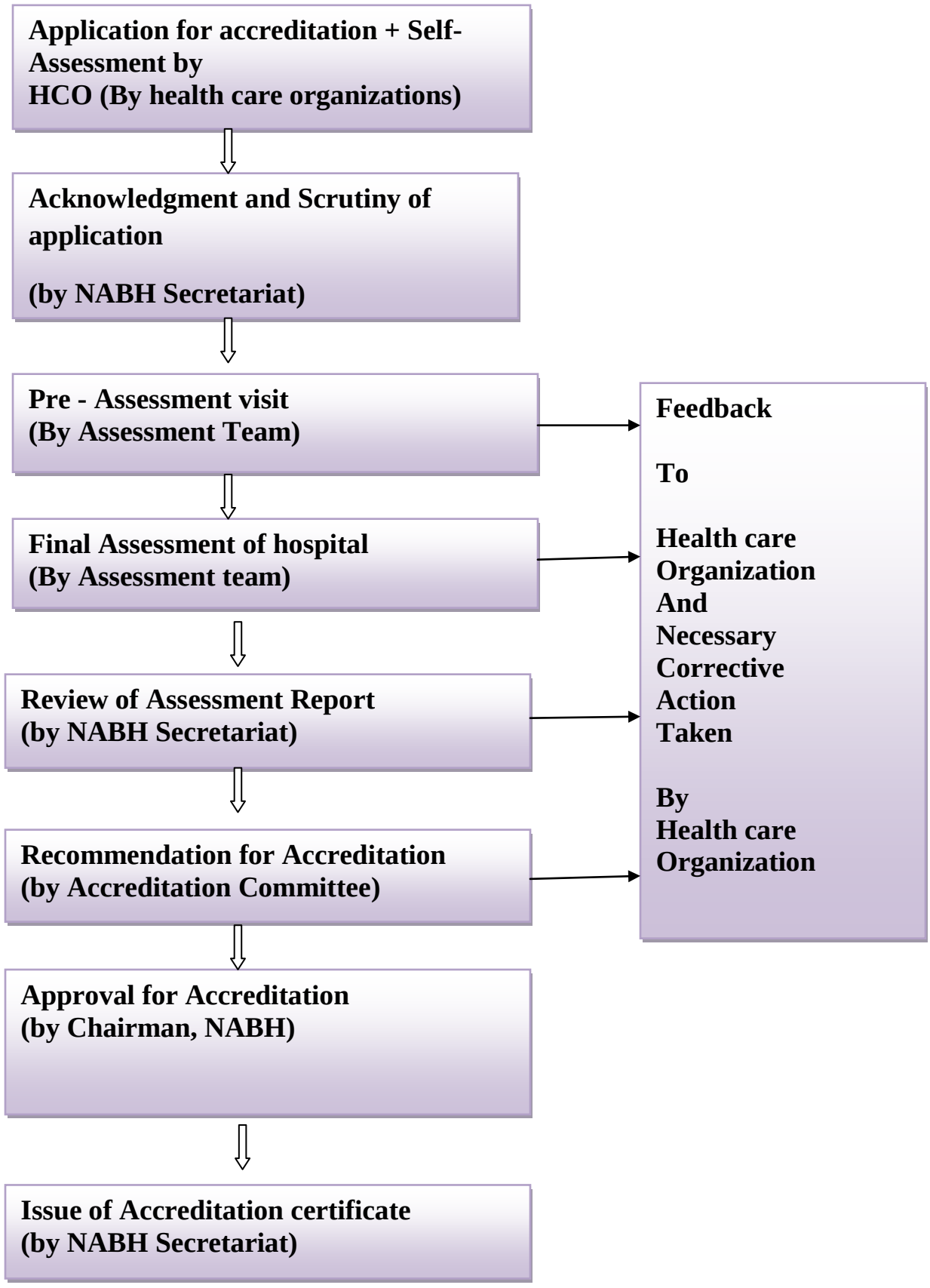
After receiving the required documents, documents are sent to selected assessors with tool kit for assessment.

Scheduling is done of pre assessment based on HCO's readiness and availablily of assessors

After pre assessment , scheduling done for Final assessment based on assessment report, time allotted for correction (closure of N.C)

Review by Accreditation Committee : report is reviewed by committee and based on findings presented by assessors following Award is given
Accreditation
Progressive level
Entry level

Fig 2.1 Process flow



INTERNSHIP ASSIGNMENT

Software Development for NABH

After understanding the process and activities at each level, the requirement and functioning of software were needed and as a management trainee we were asked to make it, software development was named as **DREAM DIGITALISATION** by NABH.

Objective was to design and develop a web based application to capture all essential data to comply with the National Accreditation Board for Hospitals & Healthcare Providers (NABH) standards.

NABH has a large volume of applications and needs to move on to an efficient online method of tracking applicants, managing the accreditation process and providing a more efficient method for assessors and finally provide accountability data to NABH secretariat and committee members.

Based on our understanding of process and various activities following requirement was suggested

User roles with different privileges

Stakeholders are divided into 4 groups and exclusive login ids and passwords will be assigned to the members of each group. The access to information will be group specific. Various groups are:

1. HCOs
2. Assessors
3. Committee members
4. NABH secretariat

Requirements

1. Software Requirements Specification (SRS)
2. Desired features for system architecture
3. Data entry for old records
4. Training to NABH staff
5. Help Desk
6. Software maintenance
7. Data backup

1. Software Requirements Specification

1.1 To digitalize the documentation of NABH (to start with hospital accreditation programme) for effective documentation and management with the aim of maintaining minimal manual records.

1.2 To have the basic software keeping in mind future requirements (scalable).

1.3 To address requirements from assessors, committees and secretariat point of view.

1.4 To effectively disseminate information among all concerned in NABH secretariat and assessors.

1.5 To address and track clinical indicators.

1.6 To maintain and track assessors database, performance and feedback.

1.7 For knowledge sharing among assessors, committees and HCOs (applicant and accredited).

2. Desired Features for System Architecture

2.1 System architecture

The proposed system may be a web based system built to serve the users spread over the internet and intranet. The server-side will host the web enabled database for serving data. Typically, the users may request information from an Internet server holding the data repository and upload documents. Then the server will process the request and send the information back to the users. The server components, i.e. the web server or application server and the data server should form a part of the server architecture.

Only authorized NABH staff should have access to the server application or database. This architecture may have to be developed specifically for internet applications for publishing secure data. It may be designed to handle intranet sites and should scale to meet server capacity needs as web site demand increases.

We may need following servers, but this should not be considered as complete list

i. Web server/application server
ii. Data base server
iii. Backup servers
iv. Firewall and load balancer

2.2 Desired features for documents and content management system

i. Robust highly available web portal
ii. Document/content management system
iii. General information on common site for all, and specific information resource pages for members, HCOs and assessors.
iv. Provision for suggestion and discussion on general page
v. Online registration and access for committee members and secretariat, HCOs and assessors
vi. Online forms (convert from physical forms)
vii. Online application, self assessment toolkit, documents submission
viii. Online payment system
ix. Searchable database of users, hospitals, assessors etc.
x. Mail merge system to automatically send emails to notify on actions pending.
xi. Data of clinical indicators of HCOs.
xii. Documentation (training manuals, online help, videos, FAQs etc.)
xiii. Audit trail for each HCO as per their unique ID number by NABH secretariat.
xiv. Online tracker for applications(application form status)
xv. Automated updating of lists of new registrations, payments received etc
xvi. Provision to compare ratings of present and past assessments/self and pre assessments.
xvii. Mail and online Alerts (when logging in, there can be a page with alert and alert history for the user).

xviii. Online entry by assessors for assessment (pre, final, surveillance) checklist

Second and Third year Fee Reminders: Mail alert to HCO for submission of the required annual accreditation fee.

xix. Maintain and track assessor database, performance and feedback.

xx. Resource Pages for assessors, HCOs- refer to page no. 14

xxi. Dashboard- for details refer to page no. 13.

xxii. Document and work flow Management

a) Multiple users should be able to view the documents.

b) During the assessment process the documents can be viewed by multiple people based on role. Similarly, editing privilege will be based on role.

xxiii. Complaints record/documentation-kind of complaint, resolution, time within which complaint resolved

xxx. Follow up

Surveillance visit: NABH gets an alert 1 month before the surveillance visit. Hospitals upload the updated documents, if any. NABH gets an alert for the same.

Re-assessment: System would provide various alerts to NABH and HCO for re-assessment six months before the expiry of accreditation

Accreditation Programme Process Flow, alerts and function of software at various steps

NABH standards and guidelines can be purchased and downloaded online by making necessary payment.

Submission of application and documentation

1. The application form should be available online and can be filled online. However the option of sending application by post will remain. For the payment details (it is also proposed to have online payment option). Scanned signature of HCO representative may be allowed.
2. A unique id/registration no. and password is auto generated when the application form is accepted online. This is used by the hospital to log in to its account for any future correspondence. The hospital is in a "pending state" until the secretariat accepts the

payment. Status of the application is displayed on the site and alerts sent to HCO and NABH.

3. All mandatory columns to be filled before uploading application form (esp. payment details. The terms and conditions document is to be modified to include a column for application no. and state that application no. --- has been electronically submitted.
4. If payment is not made online, the HCO takes a print out of terms and conditions and writes the application no., sign it and send a hard copy to NABH secretariat along with the cheque/DD. NABH to confirm payment has been received – email notification of payment received confirmation.
5. The HCO is then asked to submit/upload the self assessment toolkit through their ID.
6. Documents submission

   a) Against each standard HCO should provide supporting documentation to confirm to the standards. Documents may be uploaded (Supporting documents can be heavy files in various formats - pdf, word, excel, ppt, etc.) or sent by post. Scrutiny of documents sent by the HCO is done at NABH office, and the status of documents is displayed online (Complete/Incomplete). A list of documents is displayed online, with the documents received showing a tick mark against the name of the document.

   An alert is also sent to HCO. Once documentation is complete, alert is sent to NABH.

b) The documents are uploaded chapter wise and the same are made available to the designated assessors. The designated assessor should be able to review the documents for its adequacy and enter the comments if any and the HCO and the secretariat will be alerted of the same. The HCO also uploads the list of statutory requirements, the status and expiry if applicable.

c) HCO has the responsibility to notify NABH that they are ready for pre-assessment.

Pre-assessment

1. Selection of assessors based on geographical location and qualification from assessors list. Software should provide assessor's details like number of assessments done, grades, present assignments/assessments to be undertaken by date etc. are displayed. Alerts are sent to Assessors and HCOs.

The assessors for PA are chosen and they are given access to the required documents by the NABH secretariat (they can access through their unique ids and password).

2. Finalized dates for PA are uploaded by NABH secretariat, and alerts are sent to assessors and HCO.
3. Software ensures role based access, privileges
4. Before the on-site pre-assessment an official email and sms alert to both HCO and assessors on the upcoming visit.
5. The PA form for assessors' use is available for downloads and uploads on their resource page.
6. Once the onsite assessment is done, the onsite assessors will submit a PA report which the HCO will have to respond to. The PA report outlines any deficiency, standard, correction, corrective action, preventive action, objective evidence, and Principal assessor's comments. The assessment team will upload the report, and an alert to HCO and secretariat will be sent indicating that the PA report is ready for viewing.
7. HCO will need to submit a PACA report. The due date of this report is discussed during the site visit and the principal assessor will enter the date into the software. Two weeks before the due date an alert is sent to the HCO and NABH secretariat. At this point if the HCO wishes the secretariat can change the due date of the report. An email to confirm the change in date will be sent automatically to the HCO.
8. The principal assessor also uploads the team feedback form on the assessors resource page. Similarly the HCO submits the feedback forms about the team to NABH secretariat.
9. The HCO uploads the pre assessment corrective action report (PACA).
10. Mail and SMS alerts to assessment team for review. Automatic alerts are sent to the team after seven days if the assessment team fails to upload their comments.
11. The assessors review the report and upload their individual comments and principal assessor, the consolidated comments.
12. Mail alert to NABH secretariat and in turn mail alert to HCO to view the comments online.

Final Assessment

1. The assessors for final assessment are chosen in the same manner as they are for PA, and they are given access to the required documents by NABH secretariat (they can access through their unique ids and password). At least one of the pre-assessment team will be part of the assessment team. Alerts are sent to the chosen assessors.
2. The assessor downloads the required forms and format from the assessor's resource page and uploads them back after filling them except HAF 3 & 4 which needs to also have a hard copy duly signed along with scope of services document and undertaking by the hospital for complying with all applicable rules and regulations. The following reports must be available for each assessment: score sheet, travel form. Score sheet will be entered by all team, each report should calculate the average (auto calculation).
3. The principal assessor also uploads the team feedback form. Similarly the HCO submits the feedback forms about the team.
4. Mail alert to NABH for FA report and feedback forms. Mail alert to HCO for viewing the FA report.
5. The HCO uploads the final assessment corrective action report.
6. Mail alert to assessment team for review.
7. The assessors review the report and upload their individual comments and principal assessor, the consolidated comments.
8. Mail alert to NABH secretariat for the same.
9. Whenever there is any update (by any stakeholder) the system administrator at secretariat will get an automated mail alert with the details of person uploading.

   HCO at each stage should know status and also receive an alert by email and in the system, secretariat will change the stages for information purposes

Review by Accreditation Committee

1.The accreditation committee accesses the final assessment reports and corrective action reports with the help of the unique ids and passwords provided.

Need to view the HCO final assessment, reports, secretariat will enter the final comments or results from the accreditation committee.

2. Based on FACA report Accreditation committee decides the pre-accreditation level (Entry or Progressive levels) on compliance to standards and scoring.

3. Alert is sent to NABH Secretariat

4. NABH updates the results on HCO's resource page and simultaneously email alert is sent to the HCO.

5. HCO's name is displayed online in list of accredited hospitals.

Entry and progressive level accreditation

1. Monthly alerts to those HCOs who are in Entry and progressive level for further corrective action and time period.
2. Entry and progressive level HCOs upload Correction action.
3. Alerts are sent to the Accreditation committee and NABH secretariat.
4. If accreditation committee wants verification then alert is sent to the NABH secretariat.
5. NABH secretariat finalizes the date with assessors.
6. Email alert is sent to HCOs, assessor and accreditation committee

Verification assessment

1. Verification report is uploaded by assessors .
2. Email alert is sent to HCOs, NABH secretariat and accreditation committee to view.

Surveillance Visit

Surveillance visit is within 18 months from the accreditation date

1. NABH secretariat gets a reminder alert 1 month before the surveillance visit.
2. Hospitals upload the updated documents, if any. NABH gets an alert for the same. Surveillance on-site visit – check what improvement, HCO will need to upload various indicators and reports.
3. The HCO should submit details pertaining to inputs regarding addition of facilities, infrastructure addition/modification and also to capture the various improvement activities carried out.

4. The assessors for surveillance assessment are assigned and they are given access to the required documents by NABH secretariat (they can access through their unique ids and password).
5. The assessor downloads the required forms and format from the website and uploads them back after filling them except HAF 3 & 4 which also needs to have a hard copy duly signed along with scope of services document and undertaking by the hospital for complying with all applicable rules and regulations.
6. The principal assessor also uploads the team feedback form. Similarly the HCO submits the feedback forms about the team.
7. Mail alert to NABH for surveillance assessment report and feedback forms. Mail alert to HCO for viewing the surveillance report.
8. The HCO uploads the surveillance assessment corrective action report.
9. Mail alert to assessment team for review.
10. The assessors review the report and uploads their individual comments and principal assessor the consolidated comments.
11. Mail alert to NABH secretariat for the same.

Re-Assessment

NABH gets an alert for re-assessment six months before the expiry of accreditation.

HCO also gets an alert for re-assessment six months before the expiry of accreditation mentioning that it is required to submit the application form along with the application fees and all NABH related documents.

DASH BOARD

The dash board will have the following:

1. Committees

Name and contact details of the members, committee objectives, minutes of last meeting and meeting schedule of the following bodies:

i. NABH general body
ii. Accreditation committee
iii. Technical committee
iv. Appeals committee

2. Events calendar

Dates of the upcoming assessments, conclaves, events etc. Colour coding for all these events may be used.

3. Training programmes

Detail information about the programme specification of the trainings and workshops.

4. Knowledge Centre

A knowledge centre can be created as part of the web portal for research and building awareness to the international community. Additional information may be maintained that is of benefit to NABH members and some to the general public or to potential NABH members.

5. Quality/Clinical indicators of accredited HCOs

The system will support NABH approved clinical indicator data for all the accredited hospitals. HCOs will upload their clinical data on a prescheduled frequency and simultaneously auto calculation will be done by software [1] (formulae for the indicators should be in the software)

Quality Indicators to be monitored by HCOs:

1. Percentage of medication errors
2. Percentage of transfusion reactions
3. Urinary tract infection rate

4. Respiratory infection rate
5. Intra-vascular device infection rate
6. Surgical site infection rate
7. Incidence of falls
8. Incidence of bed sores after admission
9. Bed occupancy rate and average length of stay
10. Incidence of needle stick injuries

6. Requirements from ISQua and other accreditation bodies to be incorporated

7. Resource pages for the assessors,HCOs

7.1 Assessor resource page

i. List of active assessors area wise and contact details, qualification, number of assessment to be done, performance level
ii. Forms and documents
iii. Uploading news
iv. Sharing good practices
v. Various guidelines
vi. Provision for the assessors to send queries to the secretariat
vii. Online Discussion panels for knowledge sharing

7.2 HCO resource page

i. Provision for the HCO to send queries to the secretariat
ii. Profiles of HCOs containing their details related to accreditation process

TENDER

Dream digitalization was discussed in technical meeting and got approval. Tender with specification and requirement was made and uploaded on website for bid form software companies.

LEARNINGS

1. NABH Process:
   How to file the application, different phases of accreditation, timeline for each accreditation
2. Coordinating Workshop
   Sending emails to the interested candidates, addressing their quiries.
3. Scheduling NABH Accreditation
   Coordinating with assessors and HCO'S
4. Implementation of NABH standards in hospitals
5. Process for Tender preparation
6. Requirement for NABH software,

RISK ASSESSMENT FOR FIRE SAFETY AT QUALITY COUNCIL OF INDIA BUILDING

Introduction

Fire in any occupancy has potential to cause harm to people and severe damages to property. **Fire safety** refers to precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage, alert those in a structure to the presence of a fire in the event one occurs, better enable those threatened by a fire to survive, or to reduce the damage caused by a fire. Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building [2].

Threats to fire safety are referred to as fire hazards. A fire hazard may include a situation that increases the likelihood a fire may start or may impede escape in the event a fire occurs.

The National Building Code of India lays down a set of minimum provisions to which the buildings should be designed to protect the safety of the public. The regulations can be adopted immediately or enacted for use by various departments, municipal administrations and public bodies. Part IV of the code relates specifically to fire protection and Clause 9 to 'Requirements of Educational buildings' provides guidelines on fire safe building designs. These guidelines become mandatory provisions once if state governments adopt the code through legislation.

According to Fire Protection Association,UK fires at work have three causes:

§ Deliberate act

§ People are not alert to the fire hazards

§ Carelessness of the people

These causes can be eliminated by systematic critical identification of fire risks, evaluating them based on their impact and review of existing passive and active fire protection measures.

In India fire audits are conducted by third party for the purpose of issuing statutory clearance for occupation of the high rise buildings. However nonindustrial buildings are not statutorily required to carry out similar audits as long as there is no change in the building. National

building code [4] also recommends for periodical fire safety inspection (fire safety risk assessment) by the key personnel of the occupants of the building to ensure fire safety standards. Such inspections can be carried out by internal team based on the input provided by National Building Code. In case of industrial buildings the statutory authorities insist for fire safety audits by external agencies depending on the type of activity and nature of materials handled in the buildings.

A Fire risk assessment is a structured and a systematic examination of the workplace to identify the hazards from fire. This includes all the components of the system viz. management policy, attitudes, training, design (Process, Mechanical, Electrical, etc.) aspect, layout and construction of the building, operating Inspection & Maintenance procedures, emergency plans, personal protection standards, accident records.[2]

Rationale:

A fire safety risk assessment will help determine the chances of a fire occurring and the dangers from fire that the premises pose for the people on them by taking an organised and methodical look at the premises; the activities undertaken within the premises; the potential for a fire to occur; and the harm it could cause to the people in, and around, the premises.

Scope:

This study focuses on the fire safety risk assessment carried out in an "Educational building" with a height of 15 metres or less (classification according to National Building Code) and proposes a fire safety policy for the office of the organization located in that building.

General Objective:

To conduct a fire safety risk assessment for the work place buliding.

Specific objectives:

- To identify hazards and to reduce the risk of those hazards causing harm to as low as is reasonably practicable
- To determine what fire safety measures and management policies are necessary to ensure the safety of people in the building, should a fire occur.

Review of Literature:

The statistical report of Delhi Fire Services shows that The Delhi Fire Service attended 16452 calls during the year 2009-10. Fires resulted in the loss of Rs.5902 lakhs worth of property, 399 deaths and 1967 injuries. Most of the deaths reported in the fire incident are on account of inhalation of toxic gases, which are liberated when plastics/PVC and other petroleum based, products are involved in fire. There are about 7640 fire hydrants, 302 underground static tanks, two canals and one river in the National Capital Territory of Delhi from which water is taken for the fire fighting. Many of such injuries and losses could be prevented through proper fire prevention and safety training to the people which will lead to timely management of the fire.

The occupants of a building must have knowledge on preventing fires and what can be done in case of fires.

It is interesting that the need for occupants to be more involved in the fire safety of their surroundings was supported in a research project carried out in Malaysia by the Ministry of Education, which was concerned about the continued fire problem in residential dormitories (Subramaniam, 2004, 110). This project reached the conclusion that fire-safe behavior and lifestyle need to be developed from a person's own initiatives and that external pressures, however significant, cannot make a person do what they do not understand conceptually. It was determined that the most important element in achieving a fire safe environment was to make the occupants believe in the importance of fire prevention. The next two significant elements were expanding their fire-safety knowledge, and instilling a proactive attitude that they can have a positive influence in their safety environment. The author of the project summarized, "a residential college can be equipped with the latest and best fire protection and inspectional schedule, but if there is no motivation for a fire safety lifestyle, then all these efforts will be in vain and fires will continue to happen".

METHODOLOGY:

Study design: A Qualitative method were used for study for obtaining information

Primary source

- Qualitative interviews

  Interview Summaries highlight the context for risk management in the QCI building
- Semi- structured questionnaires.

  The techniques used to collect data consisted of individual questionnaires administered to team members, semi-formal interviews with staff, regarding training, measure for fire safety
- Focus group discussion

  Mini focus groups comprising of 4 members of top management from NABH discussed regarding the possible risks that occurred in past or may occurred in present. All the identified points in the discussion were noted

  After assessment another mini focus group discussion was conducted to manage and control the identified risk and also to focus on the monitor of the same in NABH
- Direct observation including participant observation,

  For Assessments a good working knowledge of the workplace was very important, so study also involved work process understanding of the organization. Staff was involved include head as they are the most familiar with the operation or process.

  A risk assessment was done thorough detail observation at QCI building to identify those things, situations, processes, etc that may cause harm, particularly to people, material and services

  Secondary source:

  Data from NABH Secretariat, office of institute of engineers building, Delhi fire services department, National building code of India , ISO, other accreditation bodies, Insurance policy review of United India Insurance

- Check list:

  Checklist based on Building bye-law for fire safety requirement

- Mapping out the following:
    - the social scope of risk management(nearby building)
    - the identity and objectives of stakeholders
    - the basis upon which risks will be evaluated, constraints.

STEPS OF FIRE SAFETY RISK ASSESSMENT

The 5 steps used to conduct the fire risk assessment:

1. Identification of the hazards:
    - Sources of ignition
    - Sources of fuel
    - Sources of oxygen

2. Identification of the people at risk:
    - People in and around the premises
    - People especially at risk

3. Evaluation, Removal, Reduction and Protection from the risk
    - Evaluation of the risk of a fire occurring
    - Evaluation of the risk to the people from fire
    - Removal or Reduction of the fire hazards
    - Removal or Reduction of the risks to people
        - Detection and warning
        - Fire fighting
        - Escape routes
        - Lighting
        - Signs and notices
        - Maintenance

4. Recording, Planning, Informing, Instructing and Training
    - Recording significant findings and action taken
    - Preparing an emergency plan
    - Informing and instructing relevant people, coordinating and cooperating with others
    - Providing training

5. Reviewing
    - Keeping assessment under review
    - Revising where necessary

FINDINGS:

Fire Hazards within the Area/Room/Floor:

FIRE HAZARDS IDENTIFIED – SOURCES OF IGNITION FOR BUILDING

SOURCES OF IGNITION	**EXISTING CONTROL MEASURES**	**ARE EXISTING CONTROL MEASURES SUFFICIENT?**
SMOKING/MATCH STICKS	Restricted in premises	
LPG GAS at ground floor (preparing tea, warming food)	Yes	No, Extinguisher need to be placed in kitchen, Existing location need to be changed
ELECTRICAL APPLIANCES (oven, heater, fridge, AC)	MCB on each floor	
ELECTICAL MATERIAL at ground floor (like plug, sockets, unrepaired)	No	

STRUCTURE:

The building comprises of a three storey including ground floor, office block constructed in 1927, concrete construction, rectangular in shape, type educational.

The building has one stairway, one lift.

The premises are considered to be of low risk as in the event of fire and there is little chance of anyone being placed at risk.

Building belongs to Institution of Engineers Building, QCI office is on second floor, taken on rent.

OCCUPANCY:		**SIZE:**	
Times the Premises are in use:	**8.00am. to 8.00pm**	**Area** **Covered Area**	**Area:6477.00 sq ft,** **2104 m sq**
The Total Number of Persons Employed within the Premises at any one time:	**40 -50**	**Number of Floors**: **Basement**	**3 including ground floor** **Not present**
The Total Number of persons who may resort to the premises at any one time:	**50 – 60**	**Number of Stairs:**	**1**

FIRE SAFETY SYSTEMS WITHIN THE PREMISES	
Fire Warning System: **(i.e. automatic fire detection, break-glass system)**	**Electric fire alarm on each floor, but not regularly checked**
Emergency Lighting)	**Non-maintained**
Other: (i.e. Sprinkler System)	**Not required since building falls below 15 mts height**
FIRE FIGHTING EQUIPMENT	
Fire extinguishers, **Hose reels and** **Fire blankets,** **<u>Safes & Fire Cabinets</u>**	**Total 7 extinguisher on ground floor,** **5 extinguisher on 1 floor,** **4 extinguisher on 2nd floor** **Locations need to be changed according to the requirement.** **Type: ABC & BC** **Not required** **Not present, basic requirement need to be kept**
Fire Resisting construction	

Fire resisting construction is required to secure the means of escape	**Data could not be accessed**
Fire Exits	
Identify what fire exits are required	**No separate fire exit/only QCI has has 1 emergency exit from its office which directly open in lobby**

Horizontal Escape

The occupants in the area/room/floor are familiarity with the premises

The time it would probably take to escape (2-3 minutes)

Travel distances – there is no such provision of emergency exit in building but the nearest available exit on each floor is of 4mtrs distances from respective department.

QCI has one emergency exit from department directly reaching stairs of sufficient width door to evacuate all occupants quickly and easily,

The maximum travel distance from any point in the inner room to the exit from the access room is 3 mtrs.

Corridors – obstructions in escape routes, combustibles material like paper and files are seen.

Vertical Escape

There no other stairways in case one stairway is inaccessible due to fire but since building is of 3 storey one stairway way will suffice. Stairs are wide enough to get all occupants out of premises and are free from storage.

Minimum Width Provision for Stairways required is 0.9,in building it is more than that.

Lift: Telephone/talk back communication facilities not available

Electrical : open panel boxes, hanging wires were seen, MCB on each floor was present

Static water storage tank:

No dedicated fire storage tank have been installed underground or overhead

Fire system Alarm:

Which apparently non functional during the stay of my study at QCI building no fire drill was activated.

Fire Spread from Neighbouring Buildings:

Since the building is not connected to any other building, there are no such chances of fire spread from neighbouring building.

RECOMMENDATIONS

A) HOUSE KEEPING

a) A high standard of house keeping must be insisted upon by all concerned. There must be no laxity in this respect. It must be borne in mind that fire safety is dependent to a large extent upon good housekeeping.
b) Ensuring that rubbish and combustible material are not thrown
c) Ensuring that receptacles for waste are emptied at regular intervals and the waste removed immediately for safe disposal outside the building
d) Ensuring that the entire structure of the building is maintained in good repairs

B) SMOKING RESTRICTIONS

a) Smoking shall be prohibited throughout the offices and in all areas where there is a profusion of combustible materials. Easily readable "NO SMOKING" signs must be conspicuously posted at locations where they can catch the eye.
In all places where smoking is permitted ashtrays, half filled with water, must be placed on each table/at each other suitable locations for safe disposal of spent smoking material

C) ELECTRICAL

Since heaters are used during winters, the following precautions must be taken.

a) All heaters, except convector heaters, must be fitted with guards.
b) Defective heaters must be immediately removed from service until they have been repaired and tested for satisfactory performance
c) Heaters must not be left unattended while they are switched on.

D) SIGNAGES

Proper signage's showing emergency exit, assembly place, "**Incase Of Fire Do Not Use Lift",** no smoking in pictorial form

E) Filling up of old furniture and other combustible materials such as scrap paper, rags, etc. must not be permitted anywhere in the building. These must be promptly removed from the building.

F) More than one portable electrical appliance must not be connected to any single electrical outlet.

G) Records must not be piled/ dumped on the floor

H) **Maintenance**

The emergency escape routes and other fire safety provisions must be maintained, at suitable intervals, by a competent person and the maintenance recorded.
Produce a maintenance schedule that covers firefighting equipment.
Specify who will carry out the maintenance in the management system and where it will be recorded i.e. in the Fire Log Book.
A suitable and sufficient system of maintenance should be adopted for all preventative and protective measures. The following items should be addressed in the maintenance schedule for the premises.

Daily checks

Ensure that any security devices on fire exits do not impede escape, ensure that doors on escape routes swing freely and close fully and check exits and escape routes to ensure they are clear from obstructions and combustible materials and in a good state of repair. Check the fire alarm panel to ensure the system is active and fully operational. Where practicable, visually check that emergency lighting units are in good repair and apparently working. Check that all safety signs and notices are legible.

Weekly tests and checks

Test fire detection and warning systems and manually operated warning devices weekly following the manufacturer's or installer's instructions. Check that fire extinguishers and hose reels are correctly located and in apparent working order.

Monthly tests and checks

Test all emergency lighting systems to make sure they have enough charge and illumination according to the manufacturer's or supplier's instructions. This should be at an appropriate time when, following the test, they will not be immediately required. Check that all fire doors in good working order and closing correctly and that the frames and seals are intact.

Six-monthly tests and checks

A competent person should test and maintain the emergency lighting and fire detection and warning system.

Annual tests and checks

All fire fighting equipment, fire alarms and other installed systems should be tested and maintained by a competent person.

I) **Training:**

All staff should receive fire safety training including a full explanation of the Emergency Action Plan. This should be carried out on induction and other regular periods, (usually once or twice a year). The training programme should also include who receives training, what topics in the training are covered, how often it is given and where it is recorded. (To include staff acknowledgement of training given). Training should be given to staff by competent trainer, (competent person is someone with enough training and experience or knowledge and other qualities to be able to implement these measures properly) if organization's member is giving training then he should be trained from fire services for training.

In house training is carried out by trained person, in house programme should consists of the following activities.

1. Communication
   whom to communicate, in charge person who will call fire brigade
   Who will notify and to the head and staff, fire dept and nearest police station

2. Trained for Various means of escape (roof exit)
   Know where your exit is

2. Fire alarm system

Manually operated at each designed area.

To ensure prompt rising of fire alarm and fire fighting efforts in the event of a fire.

3. To safeguard the human lives first in the event of fire, followed by materials

4. Training with regards to the available fire prevention and detection system**.**

Response to fires at various levels

Training of staff in the use of fire fighting equipments.

Classification /Use of portable fire Extinguisher of various types

Know where your Extinguisher is

To organize fire drills

5. Plan of action on fire prevention and also various steps to be taken during a fire emergency. Safe operating procedure to be followed in prevention and containing fire hazard.

6. Facility Executive/ supervisor to assess fire fighting requirements, mobilize equipments and lead the fire fighting team (i.e. Facilities and security personnel)

7. How to isolate the area from electricity.

Fresh air and exhaust systems to be shut down

Power to shut down

8. To liaise closely with the state Fire department.

I) Documentation:

Records may be kept for the following:-

a) Training sessions/drills conducted
b) Fire safety risk assessments
c) Any fire related accidents

FIRE EVACUATION PLAN

Fire Safety

1.1 How fire starts:

Fire is the result [Chemical reaction]

When the following ingredients are present in close proximity.

1. Combustible Material.
2. Source of Heat [Spark or Naked Flames]
3. Oxygen and Air [Air contains 22% Oxygen]

1.2 THE TRIANGLE OF FIRE

- Combustible material
- Material Source of Heat
- Fuels
- Paper
- Wood etc.

1.3 Source of fire in NABH office Identified Are:

- Electrical e.g. sockets (Higher Percentage)
- Pantry
- Sabotage

1.4 Class of fires:

A Class Fire ---------- General Fire

Class A extinguishers are for ordinary combustible materials such as paper, wood, cardboard,and most plastics.

The numerical rating on these types of extinguishers indicates the amount of water it holds and the amount of fire it can extinguish.

B Class Fire ---------- Oil Fire

Class B fires involve flammable or combustible liquids such as gasoline, kerosene, grease.and oil.

C Class Fire ---------- Electrical Fire

Class C fires involve electrical equipment, such as appliances, wiring, circuit breakers and outlets. Never use water to extinguish class C fires - the risk of electrical shock is far too great! Class C extinguishers do not have a numerical rating. The C classification means the extinguishing agent is non-conductive.

As these listing shows, an ABC type extinguisher is capable of extinguishing most fires. The NABH has appropriate class of Extinguishers i.e. **ABC** installed in Fire Cabinets/ Points.Extinguishers are selected according to the potential Fire hazard [Example Building are normally prone to class C Fire (Electrical Fire)]

Staff should know:

1. Fire points [Numbered] with extinguishers Sand and Water.
   Locations of various Fire extinguishers
2. Sources of water [Hydrants] close to vulnerable areas.
3. Fire alarm System [Smoke detectors].
4. Sources of water and pumping systems [underground/overhead].

1.5 In case of Fire

1. In the event of fire, it is the first duty of all concerned to prevent injury or loss of life.
2. For this purpose employees are made familiar with all means of escape from the building during training.

Since there may be an opportunity, in the event of fire, for staff member to attack it with the nearest fire extinguisher, staffs are trained how to use them during training, if not, then do not take any personal risk.

3. Immediately after you discover a fire or one is reported to you, you should

"SOUND THE ALARM – ALERT THE PERSONS'

4. Ensure that the fire brigade is called immediately on the sounding of the

fire alarm by concern person security in charge.

5. Immediately after the fire alarm has been sounded, you should

(i) Evacuate the building following the means of escape in accordance with the detailed Evacuation procedure.

(ii) Assemble at the assembly point for roll call and further instruction.

EMERGENCY EVACUATION PROCEDURE

Audible alarms are provided at reception and entrance and other designated areas, Notification to staff by Incharge by phone calls or announcement.

On hearing the fire alarm, Staff will be on alert and unless the fire occurs in their immediate area, should not commence any evacuation unless told to do so by the Supervisor (Incharge).

On being told to evacuate Staff should evacuate in the direction they are told by supervisor incharge or by whatever means they consider suitable and necessary, on to and down designated stairways only and must not use the lift.

Guidance provided by trained person, to ensure that those passing down move as safely and quickly by stairs and assemble at designated point (lawn outside the building) and wait for further instruction

Attendance sheet must be taken by human resource person verifying on day attendant sheet which will give the idea of number and name of the employees present for the day.

If evacuation by stairs are not possible than ladder is placed from balcony which is located at the 2nd entrance of QCI and staff members are evacuated by help of trained personnel.

PRECAUTIONS TO BE TAKEN: [When attempting to put out a fire]

1. Activate the nearest Fire alarm.
2. Notify the Fire Department.
3. Have the correct Extinguisher
4. Approach the Fire with you back to an exit

Remember to leave the area

[A] Your path of escape is being threatened.

[B] If your extinguisher is empty.

1.6 Planning**:**

NABH has a Safety Committee that monitors all safety aspects and preparedness.

The following plans/policies are available.

1. Emergency Evacuation
2. Policy on Mock Drills
3. Simulated fire Drills
4. Fire equipment Maintenance plan.

Composition of safety Committee:

THE PRINCIPLE OF R.A.C.E.:

R- For Rescue. If the Fire is in a specific department evacuate from that area immediately.

A - For Alarm, Activate the Alarm System so that Security Personnel or In charge receive the Signal.

C - Contain the fire to any given area by Shutting of exits through which it can spread.

E - Extinguish if possible otherwise Evacuate

LIST OF NEAR BY HOSPITALS:

S No.	Hospital Name	Location	Phone No.
1.	G.B.pant Hospital	Daryaganj	011 – 23556879
2.	Lok Nayak Hospital	Daryaganj	011-23230733

1.7 Management:

- Regular training/mock drills
- Periodic checking of the equipment by person in charge
- Alarm is checked periodically
- List made available to each cabin with emergency telephone no.
- Monitoring: electrical sockets.
- Monitor pantry.

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ANNEXURE
(CHECKLIST)

Identify Fire Hazards (Sources of Ignition)			
Type	***Location***	**Are existing control measures suitable?** **YES**	**NO**
Naked Flames	Ground floor		NO
Portable Heaters and Heating Equipment	Offices 1st & 2nd floor	YES	
Electrical Equipment	Ground,1st and 2nd floor		NO
Cooking Equipment	Pantry ground and 2nd floor		NO
Arson	Can be a cause	YES	
Smoking Materials	------		NO
Other Sources (including Contractors)		YES	NO

What need to be done?
Extinguisher to be placed in kitchen, regularly checked
Electrical sockets and panel box needs to be monitored and maintained
No smoking signage with pictorial form.

Evaluate, Remove, Reduce and Protect From Risk	YES	NO
Are ignition sources controlled to reduce the chances of fire?	YES	
Are combustible materials kept away from ignition sources?		NO
Are all windows and openings closed last thing at night?	YES	
Is your fire alarm system adequate for your premises?		NO
Will everybody be warned if the fire alarm operates?	YES	
Can everyone escape without assistance?	YES	
Is escape from fire available in more than one direction?		NO
Are all fire exits easily identified by the correct signs?		NO
Are escape routes free from obstruction and storage?		NO
Are all doors on escape routes easily opened without a key?	YES	
Do all doors on escape routes open in the direction of escape?	YES	
Can everyone escape in a reasonable time?	YES	
Do you have emergency lighting?		NO
Is the lighting adequate to illuminate circulation routes?	YES	
Do you have fire fighting equipment?	YES	
Is the fire fighting equipment adequate for the risks present?	YES	
Are housekeeping and general waste management adequate?		NO
Are security arrangements sufficient to prevent access?	YES	NO
Are measures adequate to prevent the incidents of arson?	YES	
Are there any large open roof spaces or concealed ceiling voids?	YES	
Could a fire in your premise spread to another?		NO
Can the fire service easily get to your premises?	YES	

Record, Plan, Inform, Instruct and Train

Record Of Fire Safety Arrangements – *this includes:*	YES	NO
Have you made an emergency plan?		✓
Have you provided fire instruction and staff training?		✓
Are there records of fire drills to test your training and emergency plan?		✓
Are there records of maintenance on all fire safety measures?		✓
Have you recorded the significant findings of this assessment ?	YES	

Review

Fire Safety Risk Assessment Must Be Kept Up To Date

Date of next review It is recommended that organisation review fire safety risk assessment regularly (recommended every 12 months) **OR** if make changes to the layout of your premises, any changes to work processes, significantly increase the amount of combustible materials stored or displayed or sources of ignition, change your opening hours (e.g. to include night time opening etc) or any failures in fire safety precautions then you should review your fire safety risk assessment.	**April / 2012**