Broadcasting Towers Operation

WEEK 12 – Report

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Objectives

At the end of the topic students will be able to:

1. Understand the cover page of an operator’s report.
2. Understand the content of a report
3. Understand the handover process

12.1 Cover of the report

Title

- Header: "Cellular Broadcasting Tower Operator’s Report"
- Sub-header: Including the specific tower or location name/identifier.

Date

- Reporting period: Start and end date of the reporting period.

Prepared By

- Operator’s Name: Full name of the operator preparing the report.
- Position/Title: Job title or position of the operator.
- Contact information: Email and phone number for any follow-up questions or clarifications.

12.1 Cover of the report cont’d

Reviewed By

- Supervisor’s Name: Name of the supervisor or manager who will review the report.
- Position/Title: Job title or position of the reviewer.
- Contact information: Email and phone number for the reviewer.

Logo and Branding

- Company Logo: The logo of the company or organization managing the tower.
- Company Name: Full name of the company.

12.1 Cover of the report cont’d

Version Information

- Report version: Version number or iteration of the report.
- Date of issue: Date when the report was finalized and issued.

Confidentiality Statement

- Confidentiality notice: A brief statement indicating that the report contains sensitive information and should only be accessed by authorized personnel.

12.2 The content of a report

- Fill the technical logbook
- Reporting about equipment status
- Determine the consumables materials used

Hand over to next shift operator

- Follow handover over procedures set by the company.
- Follow Policies and Regulations of hand over between operators with respect to the company’s norms.
- Submit technical logbooks in the format provided by the company.

12.2 The content of a report cont'd

- The following are requirements for handing over to the next operator:

Equipment Status Report for Broadcasting Towers

Tower Structure and Integrity

- Inspection: Regular inspections have been conducted to ensure the structural integrity of the towers. No significant damage or wear has been reported.
- Maintenance: Routine maintenance tasks, such as tightening bolts and checking for rust, have been completed.

Antenna Systems

- Performance: All antennas are functioning within optimal parameters. Signal strength and quality are consistent with expected levels.

12.2 The content of a report cont'd

- Issues: No major issues have been detected. Minor adjustments were made to improve alignment and signal reception.

Transmission Equipment

- Transmitters: All transmitters are operational and have been tested for efficiency. Power output levels are stable.
- Backup Systems: Backup transmitters are in place and have been tested to ensure they can take over in case of primary system failure.

Power Supply

- Primary Power: check whether it is stable with no interruptions reported.
- Backup Power: Backup generators and UPS systems are fully functional and have been tested regularly.

12.2 The content of a report cont'd

Cooling Systems

- Status: Cooling systems are operating efficiently, maintaining optimal temperatures for all equipment.
- Maintenance: Filters have been cleaned and replaced as needed. No issues with overheating have been reported.

Lighting Systems

- Monitoring and control systems
- Safety and compliance

12.3 Operators shift handover

Preparation by Outgoing Operator

- Documentation: Prepare a detailed report summarizing the activities of the shift, including any incidents, maintenance tasks, and operational status of the broadcasting towers.
- Checklist: Use a checklist to ensure all tasks are completed and documented.
- Equipment status: Note the status of all equipment, including any issues or maintenance needs.

Handover Meeting

- Face-to-Face Communication: Conduct a face-to-face meeting with the incoming operator to discuss the shift report.

12.3 Operators shift handover cont’d

- Key points: Highlight critical issues, ongoing tasks, and any safety concerns.
- Questions and clarifications: Allow time for the incoming operator to ask questions and clarify any doubts.

Cross-Checking by Incoming Operator

- Review documentation: The incoming operator should review the shift report and checklist.
- Inspect equipment: Verify the status of the equipment and ensure everything is in order.
- Follow-up actions: Note any follow-up actions required and prioritize tasks for the shift.

12.3 Operators shift handover cont’d

- Effective Communication
- Clear and concise: Ensure all communication is clear and concise to avoid misunderstandings.
- Timely updates: Provide timely updates on any changes or new issues that arise during the shift.
- Use of templates and forms
- Standardized forms: Utilize standardized handover forms to ensure consistency and completeness.
- Digital tools: Consider using digital tools for real-time updates and easier access to information.

12.3 Operators shift handover cont’d

Safety and Compliance

- Safety briefing: Include a safety briefing to address any potential hazards or safety protocols.
- Compliance checks: Ensure all operations comply with regulatory standards and company policies.

12.3 Operators shift handover cont’d

- To create a comprehensive report and handover document for the work done by broadcasting tower operators in the field, these steps are very important:

1. Introduction

- Project overview: Briefly describe the project and its objectives.
- Team members: List the names and roles of the team members involved.

2. Work summary

- Tasks completed: Detail the tasks that were completed, including maintenance, repairs, and upgrades.
- Dates and Times: Include the dates and times when the work was performed.

12.3 Operators shift handover cont’d

3. Technical details

- Equipment used: List the equipment and tools used during the operations.
- Technical specifications: Provide any relevant technical specifications or measurements taken.

4. Challenges and solutions

- Issues encountered: Describe any challenges or issues that arose during the work.
- Resolutions: Explain how these issues were resolved.

5. Safety measures

- Protocols followed: Outline the safety protocols that were followed.
- Incidents: Report any safety incidents and how they were handled.

12.3 Operators shift handover cont’d

6. Visual documentation

- Images: Include images of the work done.
- Before and after photos showing the condition of the towers before and after the work.
- Work in progress with photos taken during the work to show the process.
- Equipment and tools with images of the equipment and tools used.

7. Conclusion

- Summary: Summarize the key points of the report.
- Next steps: Outline any follow-up actions or recommendations for future work.

12.3 Operators shift handover cont’d

- When operators for cellular broadcasting towers prepare a report before handing over to the next operator, they typically follow a structured process to ensure all critical information is communicated effectively.
- The report usually includes details about the current status of the tower, any maintenance or repairs performed, issues encountered, and recommendations for future operations.
- The operator also documents the performance of the tower's equipment, including power supply systems, cooling systems, and signal transmission quality.
- The report serves as a comprehensive guide for incoming operator, helping them understand the tower's operational history and any ongoing concerns.

12.3 Operators shift handover cont’d

- It ensures a smooth transition and continuity in the tower's performance. The process emphasizes clear and concise communication to avoid any potential disruptions in service.
- Steps followed by operators for cellular broadcasting towers when preparing a report for handover to the next operator:

Daily Log Review

- Information provided: The operator reviews the daily logs to gather information about the tower's operations over the past shift. This includes any incidents, maintenance activities, and performance metrics.
- Purpose: Ensures that all recent activities are noted, and any ongoing issues are highlighted for the incoming operator.

12.3 Operators shift handover cont’d

Status check

- Information provided: Details about the current operational status of the tower, including power supply levels, signal strength, and any alarms or alerts that are active.
- Purpose: Provides a snapshot of the tower's condition, helping the new operator quickly understand the current state of operations.

Equipment performance

- Information provided: Reports on the performance of key equipment, such as transceivers, antennas, and backup power systems. This includes any observed anomalies or degradation in performance.
- Purpose: Ensures that any potential issues with equipment are identified and monitored.

12.3 Operators shift handover cont’d

Maintenance activities

- Information provided: Records of any maintenance or repairs conducted during the shift, including the nature of the work, parts replaced, and any follow-up actions required.
- Purpose: Ensures continuity in maintenance and that any pending tasks are clearly communicated.

Incident reports

- Information provided: Detailed accounts of any incidents that occurred, such as power outages, equipment failures, or security breaches. This includes the time of the incident, actions taken, and the current status.
- Purpose: Provides a clear record of events and ensures that the new operator is aware of any recent issues that may need further attention.

12.3 Operators shift handover cont’d

Recommendations

- Information provided: Suggestions or recommendations for the incoming operator, based on observations and trends. This might include routine checks to perform or areas to monitor closely.
- Purpose: Offers proactive advice to help maintain smooth operations and prevent potential issues.

Handover Summary

- Information provided: A concise summary of the most critical points from the shift, including any urgent issues, ongoing tasks, and overall tower performance.
- Purpose: Provides a quick overview that helps the new operator get up to speed efficiently.

12.3 Operators shift handover cont’d

Documentation and sign-off

- Information provided: The report is documented and signed off by the outgoing operator, ensuring accountability and a formal record of the shift's activities.
- Purpose: Creates a formal handover process that ensures all information is accurately recorded and verified.
- By following these steps, operators ensure that all necessary information is communicated effectively, maintaining the tower's operational integrity and performance.

12.4 General perspectives

- In a cellular system, the handover between two technical operators like Radio Engineers, is an important for continuity of service while maintaining the integrity of the radio access network (RAN) and full communication in general.
- This handover is typically initiated when the maintenance or technical operations of a BTS are required, and it involves significant coordination between the two like when one operator performs repairs or upgrades, and the other operator is responsible for the active service on the BTS or just a routine operation shift.
- In this process, a handover report is necessary for documenting actions taken, ensuring transparency, and providing a record of activities for future audits or troubleshooting ensuring both operators are aligned in their efforts, potential issues are identified promptly, and network performance remains optimal.

12.4 General perspectives cont'd

- The report serves as a formal documentation of the handover process, including technical details, operational changes, and any interventions made by the two technical operators.
- The report should be structured to cover all relevant aspects to ensure clarity and accountability.
- Key elements of a handover report between operators in a cellular system considering structure and parameters would be but not limited to the following: The title and basic information, key metrics and parameters, the objectives, the development, the key performed activities, the challenges and decision taken, the conclusion and recommendation.

12.4 General perspectives cont’d

- **Title and basic information**: Title of the report like handover report between operators for BTS maintenance of a BTS with location and ID.
- Date and time of handover: Specific timestamps for the initiation, execution, and completion of the handover process.
- BTS identifier: The unique identifier for the BTS (e.g., BTS ID, sector, site name).
- Operator details: Operator 1 for example Network Operator with name, contact information, position and role like responsible for active service or traffic management. Operator 2 for example Maintenance Operator with name, contact information, position and role like responsible for infrastructure maintenance and hardware/software upgrades.

12.4 General perspectives cont’d

- Objective of the handover: It include routine maintenance, hardware upgrade, system reconfiguration, or emergency repair.
- The scope of the handover: Mentions the details about what components or systems are being handed over like power systems, radio equipment, backhaul connections, etc.
- The impact on service quality or user experience, including downtime, service degradation, or alternative arrangements such as handover to another BTS.
- Pre-handover condition (initial status of the BTS): BTS operational status with proper documentation of the initial health and status of the BTS before the handover.

12.4 General perspectives cont’d

- Key metrics to capture include:
- Signal quality: Current RSSI, SINR, RSRQ, and Ec/No.
- Traffic load: Current traffic utilization, number of active users, call setup success rate, and data throughput.
- Faults or issues identified: Any previous issues with the BTS, such as m performance degradation, equipment failures, or high interference levels.
- Configuration and parameters: List the key radio parameters and network configurations: Frequency bands in use, Transmission power levels, Cell parameters such as sector configuration, antenna tilt, azimuth.
- Power supply status: battery backup, generator operation and other power related information to record.

12.4 General perspectives cont’d

- Backhaul connectivity: Link performance to ensure smooth data transmission.
- Handover procedure: Initiation of handover follows the steps taken to initiate the handover between the two operators, including:
- The triggering event like scheduled maintenance, equipment failure, required upgrade.
- Notification of the handover to the relevant stakeholders like internal teams, network operations centre.
- Pre-handover coordination including scheduling, impact analysis, and traffic rerouting, if necessary.
- Execution of handover involves step-by-step of the actions taken to complete the handover.

12.4 General perspectives cont’d

- Backup resources with details of any traffic rerouting to other BTSs or load balancing steps taken.
- System modifications with any modifications made to the BTS hardware, software, or configurations during the handover (e.g., frequency reassignment, software patching).
- Synchronization procedures comprising of the methods used to ensure proper synchronization between the source and target BTS which considers the adjustment of timing advance, and ensuring frequency synchronization, etc.
- Equipment status that contains documentation of the status of the equipment as within the handed over, including any power cycling or hardware replacement.

12.4 General perspectives cont'd

- Technical parameters and modifications where radio parameters are monitored and include; Signal Strength (RSSI) and Quality (SINR, RSRQ) before and after the handover, cell load and traffic shifts determining how much traffic was shifted and how it impacted the BTS and surrounding cells, Radio Access Technology (RAT) determining whether the handover involved a change in RAT such as GSM to 3G, 4G to 5G), equipment configuration changes with changes made to the BTS hardware like antenna adjustment, sector reconfiguration, software upgrades or patches that were deployed during the handover as well as power management that comprises documentation of any power-related actions such as battery changes, generator start-up, or power supply adjustments and backhaul connectivity determining if the handover involved changes in the backhaul connection, such as switching from a fiber link to microwave or another.

12.4 General perspectives cont’d

Post-handover monitoring and validation:

- Service restoration: The status of the BTS and services after the handover is complete including network accessibility by verifying that the BTS and its associated network elements are accessible, signal and service quality checks including post-handover measurements of signal strength, SINR, and user experience metrics, validation of traffic loa with the insurance of traffic properly shifted and BTS can handling the load, troubleshooting (if needed) containing documentation of any issues that arose after the handover, including steps taken for resolution and any downtime experienced, network performance monitoring ensuring that there are no long-term performance degradation or issues affecting service quality, and provide data or insights into the BTS operational health.

12.4 General perspectives cont’d

- Conclusion and recommendations provide the outcome of the handover with final summary of the handover that incorporate the completion and successful ness as well as all issues encountered and how they were resolved.
- Supporting documents with logs and graphs attached with relevant system logs, performance graphs or screenshots of the BTS parameters before, during, and after the handover.
- Service impact assessment: Any reports on user impact, including service interruptions, delay, or quality degradation.
- Maintenance records: If any hardware was replaced or software was upgraded by including the relevant details of the parts used, serial numbers, software versioning, etc.

12.4 General perspectives cont’d

Section	Details
Title	Handover report for BTS [ID/Name] – [Date/Time]
Operators involved	Operator 1: [Network operator Name]
	Operator 2: [Maintenance operator Name]
BTS location	[Geographical/ID Info]
Purpose of handover	Maintenance, upgrade, fault resolution, etc.
Pre-handover condition	Signal strength, load, performance metrics, faults
Handover procedure	Step-by-step description of actions taken
Technical changes/parameters	Radio parameters, equipment changes, configuration
Post-handover monitoring	Validation of service, signal quality, traffic handling
Conclusion and next steps	Success summary, issues, lessons, follow-up actions
Supporting documents/logs	Performance graphs, logs, equipment changes, etc.

12.4 General perspectives cont’d

- A well-documented handover report between two operators is vital for ensuring transparency, maintaining operational integrity, and reducing the risk of issues arising during maintenance or changes in the BTS infrastructure.
- The report serves as a formal record for the entire handover process and is an essential tool for both immediate troubleshooting and future reference.
- By providing a clear account of actions taken, technical modifications, and performance outcomes, both operators can work together to optimize the maintenance and operational efficiency of the BTS and ensure continuous service for end-users.

12.4 General perspectives cont’d

While initiating the construction of a site:

- Scheduling
- Budget tracking
- Material procurement
- Tower and foundation analyses
- Zoning and permitting approvals
- Daily project forecasting and reporting

(https://www.anscorporate.com/cell-tower-construction)

12.4 General perspectives cont’d

(https://fatfinger.io/essential-elements-of-shift-handover-checklist/)

12.4 General perspectives cont’d

Some reports have various purposes and might consider the following:

- Carrier
- Distance from the user's location
- Heading in degrees from the user's location
- Latitude
- Longitude
- Elevation at sea level
- Tower Height
- Line of Sight (LoS) with the Tower
- Type of obstructions (if any)

12.4 General perspectives cont’d

The report helps in:

- Determining the closest towers to a location for selecting the best cellular tower and carrier
- Selecting an antenna that is compatible with the distance, heights and terrain
- Determining if the height of an antenna mask/tower will obtain Line of Sight with a cellular tower
- Knowing the exact heading to use for aiming a directional antenna.

Thank you for your good attention

Q&A

References

- Cell Tower Construction, ANS Advanced Network Services, 2023.
- 4 Essential Elements of a Shift Handover Checklist, FAT FINGER, 2023.