Introduction to Toll Operations

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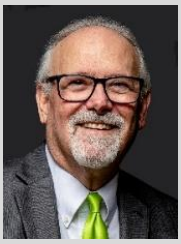
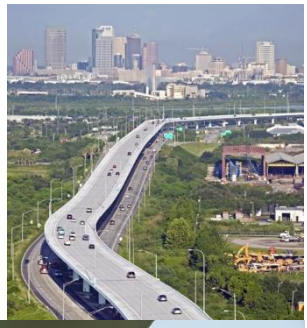
The 11 videos that comprise the "Introduction to Toll Operations" educational series are based on the knowledge and personal experience acquired by Martin Stone during his long career in tolling as a senior manager for the Tampa-Hillsborough Expressway Authority; as the US COO for Egis Projects, Inc., an International infrastructure provider and operator; as a senior consultant to FDOT and the Florida Turnpike Enterprise; as a private consultant to multiple software and hardware providers and service contractors; and as the Chairman of the IBTTA National Interoperability (NIOP) Committee from 2009 – 2014. The opinions about software, hardware, roadside and back-office operations, and service delivery expressed within this video series are based exclusively on his own knowledge and experience. The information presented in these videos is not representative of any official positions or policies related to AtkinsRealis.



- 40+ years in transportation, tolling, back-office operations and professional training & communications
- Master's Degree in Planning from the University of Florida and a Ph.D. in Public Administration
- Lean Six Sigma Green Belt
- As Egis Projects USA COO, he was involved in three back-office operations that each achieved >95% customer satisfaction.
- As former Planning Director for the Tampa Hillsborough Expressway Authority, he planned, developed and managed the installation of the 1st Free Flow Toll Lanes in Florida and the 1st Florida conversion of a full toll system to All-Electronic Tolling with new AET business rules, hardware, software, and a new operational and commercial back-office concept.
- First Chairman of the IBTTA National Interoperability (NIOP) Committee that established the goals and objectives for uniform nationwide ETC operations and the creation of the plan for regional interoperability and the evolution to national interoperability.
- As a consultant to the Florida Turnpike Enterprise, he was directly involved in the development and implementation of the original Sunpass system and the conversion of elements of the Turnpike Ticket and Cash Systems to Electronic Toll Collection.
- As an Assistant VP for Training & Communications with Citibank, he helped manage the transition of over 500 new customer service agents as part of the relocation of multiple Citicorp Travelers Checks back-office operations from New York to a new Centralized Worldwide Service Center in Tampa, Florida.

Project Case Studies

Marty Stone's Experience Includes Major Project Planning, Facility Development and Delivery



Martin (Marty) Stone has successfully planned and delivered large complex projects for over 40 years. Notably, his projects include the planning of more than a $billion in transportation facilities such as the Tampa Hillsborough Expressway Authority (THEA) Selmon Expressway Reversible Elevated Lanes, the Selmon Gandy elevated extension and the Florida Turnpike I-4/ Selmon Connector interchange.

As Director of Planning for THEA, he conceived and managed the design, construction and fit-out of the 15,000 square foot multi-agency Transportation Management Center that included property acquisition, three floors of office space, a full computer room, and an operations center for the Reversable Express Lanes and all traffic signals in Hillsborough County under the control of the City of Tampa.

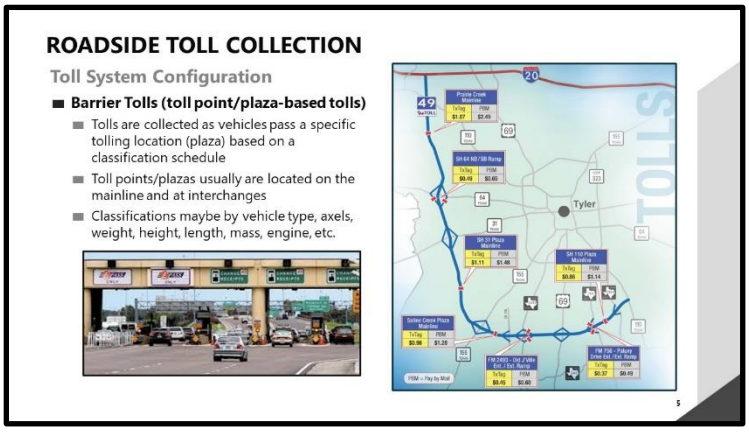
He was also on the management team for the development and transition of the 187,000 square foot Citicorp Travelers Checks Worldwide Service Center in Tampa. As Assistant Vice President and Manager of Training and Communications with Citibank in the 1980s, he oversaw a full-time staff that transitioned 50 key managers who moved to Tampa from New York and trained 500 new local employees while the new Citicorp back office was under construction. Then, Marty was an integral part of the team that spearheaded the operation of the back office using the legacy system that was still on-line in New York City and on Long Island. Running a full parallel shadow operation at a temporary location in Tampa, the team conducted full readiness testing for the new facilities and technologies and then delivered the Go-Live weekend that transitioned the systems and operating staff**.**

What is amazing about that Citibank migration is the similarity of the project goals for the transition approach for a commercial back office today – to ensure that all technology and operations works perfectly before Go-Live and the transition to the new operation is completely seamless for client agencies and customers. That includes providing total transparency for officials, the media and the general public. The only noticeable result was a **significant improvement in customer satisfaction!**

Little has changed over the years in regard to Marty's philosophies and objectives for project success and excellent customer service. The principles and techniques of management and customer service training developed during the 1980's still form the basis for what he teaches today. What has changed – and remarkedly so – is the technology. ***The use of Best-in-Class cloud-based software and communications systems along with outstanding training, continuous improvement programs and certified quality management is his formula for providing customers with an outstanding experience – far exceeding what was done in the past with mainframes, spreadsheets and on-premise systems.***

INTRODUCTION TO TOLL OPERATIONS SYLLABUS

Video 1. Roadside Toll Configuration and Cash Collection (23:47)



This video discusses the three primary configurations of toll facilities that occur at the roadside, the various methods for collecting cash tolls and the rationale for converting from cash to electronic toll collection.

Toll System Configuration

- **Barrier Tolls**
  Sometimes referred to as an “open” system, this tolling identifies the amount of toll owed when a customer crosses a specific point on the roadway, bridge or tunnel.
- **Mileage-Based Tolls**
  Mileage-based tolls (sometimes referred to as a “closed” system, charges the customer based on the exact number of miles driven or established amounts between the locations where the customer enters and exists the toll system.
- **Area Tolls**

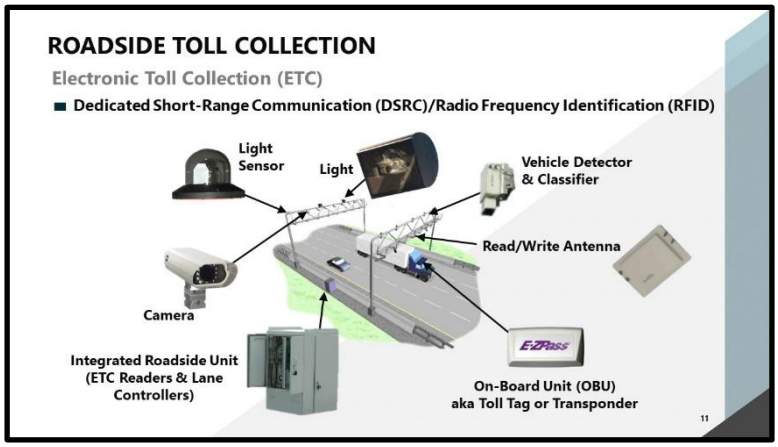
  Sometime referred to as “cordon line” tolls or “tolling zones”, these charges are applied to the identified customer when they enter a tolled area (or zone) and can be based on the time of day in that tolling zone, how long the customer stays within the tolling zone, or when the customer leaves the zone – or some other variable related to their use of roadways within the tolling zone.

Cash Toll Collection

- **Manual Toll Collection**
  A review of the technology and process of modern manual toll collection.
- **Machine Toll Collection**
  A short description of the types of toll collection machines used by the toll industry.
- **Toll Plaza Facilities**
  A short overview of the characteristics of typical toll plazas.
- **Back Office Cash Operations & Security**
  A review of the requirements and additional costs of back-office cash operations.
- **Moving from Cash to Electronic Toll Collection (ETC)**
  A short discussion of the rationale for converting from cash to ETC and a real-world example of a conversion to all-electronic toll collection.

Video 2. All-Electronic Tolling (AET) (37:21)

This discussion covers a description of the various elements that comprise AET installations as well as a high-level discussion about how those components work to identify the customer and collect tolls.



Standard AET Components

An overview of the various components that are installed at AET facilities.

Communications Protocols, Transponders and Readers

A general discussion about the typical types of communications equipment used in North America.

Toll Radio Waves & Frequencies

A brief review of how radio waves are generally used to communicate between the roadside equipment and the customer vehicle.

Canopy Designs for Mixed Use (Cash & ETC)

A brief look at canopy design (from typical cash collection locations) and how they are adapted for ETC.

AET Lane & Gantry Designs

A description of the major elements of AET systems and how they are used for the various approaches to toll collection for the following types of ETC/AET tolling:

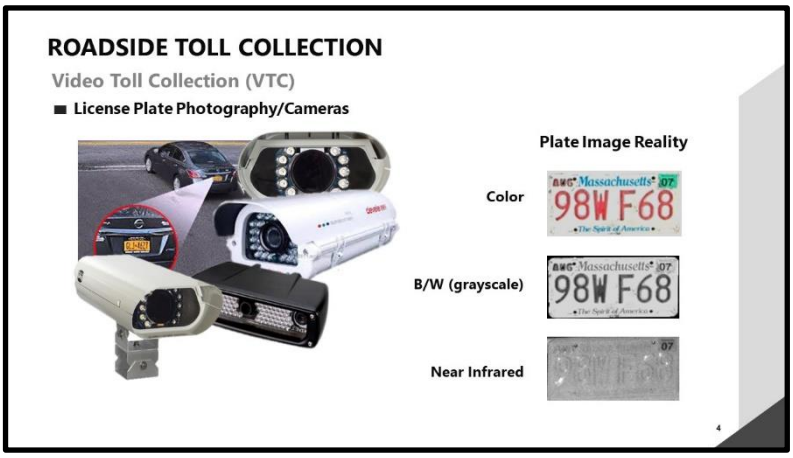
- **Dedicated Lanes** – typically old cash lanes that have been converted to ETC-only lanes by the retrofitting of ETC equipment.
- **Open Road Tolling Lanes** – ETC-only lanes that have been designed and constructed as new free-flow ETC lanes (sometimes referred to as AET lanes) with the toll equipment installed on overhead gantries, housed in buildings or cabinets alongside the roadway, and/or buried in the roadway pavement.
- **Satellite Based Tolling** – the use of satellite-based GPS and/or GNSS systems and telematics located on the vehicle to identify toll customers and assign tolls.
- **Mileage Based/Road User Fee Tolling** – the collection of roadway, bridge or tunnel user fees based on a wide range of different technologies and business rules as a method of replacing and/or augmenting fuel taxes.

Shrinking Fuel Tax and Potential Growth of Tolling

A brief look at the future impact on federal and state fuel taxes from the adoption of electric and high-mileage carbon-fueled vehicles and the potential growth of toll collection as a replacement and/or augmentation of fuel taxes.

Video 3. Video Toll Collection (VTC) (45:51)

A discussion of the use of license plate photography and the use of human and machine image review as the basis for collecting tolls.



Toll Enforcement & Video Toll Collection

How the use of cameras to provide enforcement evolved into revenue generation with the advent of open-road free-flow tolling.

License Plate Photography & Cameras

- **Challenges** – a discussion of the various challenges associated with the use of cameras as a toll revenue generating device.
- **Camera Quality** – how camera quality can be measured as part of the process of identifying requirements for the purchase of digital cameras.

Automated & Manual Image Review

- **Optical Character Recognition (OCR)/Automated License Plate Reading (ALPR)** – a brief discussion of how OCR and ALPR systems work.
- **Digital Fingerprinting** – the use of databases for the comparison of digital images as a method of increasing the accuracy and performance of OCR/ALPR systems.
- **ALPR System Performance – Tuning for Accuracy and Automation** – a discussion of how to assess and improve the accuracy and automation of OCR/ALPR systems.

Merging Machines and Human Review – the use and value of human image review as part of the OCR/ALPR process.

Video 4. US Toll Organizations, Facilities & Toll Rate Setting (20:02)

This video involves an overview of how toll facilities are organized in the US, the types of toll facilities that are constructed and how toll rates are generally set and modified.

US Toll Organizations

A discussion of the various types of jurisdictions and organizations that collect tolls in the US.

- **Individual State DOT's**
- **State Agencies**
- **Agencies of the State**
- **Multi-Jurisdictional Agencies**
- **Independent Regional and Local Agencies**
- **Private Providers Reporting to Public Organizations**
- **Private Owner/Operators**

US Toll Facilities

An overview of the various types of toll roads, bridges and tunnels found in the US.

- **Traditional Tolling (Highways, Bridges & Tunnels)**
- **Managed Lanes (Price Management)**

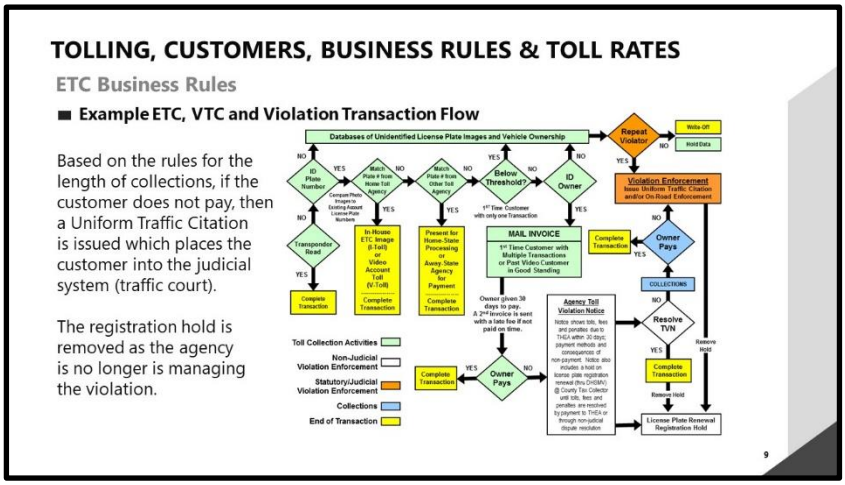
Toll Rates

A general discussion of the different types of toll rate structures and how rates are set.

- **Traditional Toll Rate Setting for Cash & ETC**
- **ETC/AET with Indexed Rates**
- **AET Variable Rates/Congestion Pricing**

Video 5. All-Electronic Tolling Customers & Business Rules (28:28)

This video contains an overview of how customers are typically differentiated on US toll roads and generally how business rules are applied for all-electronic tolling.



ETC Customers

This discussion is focused on the basic types of accounts that typically are managed for electronic toll customers.

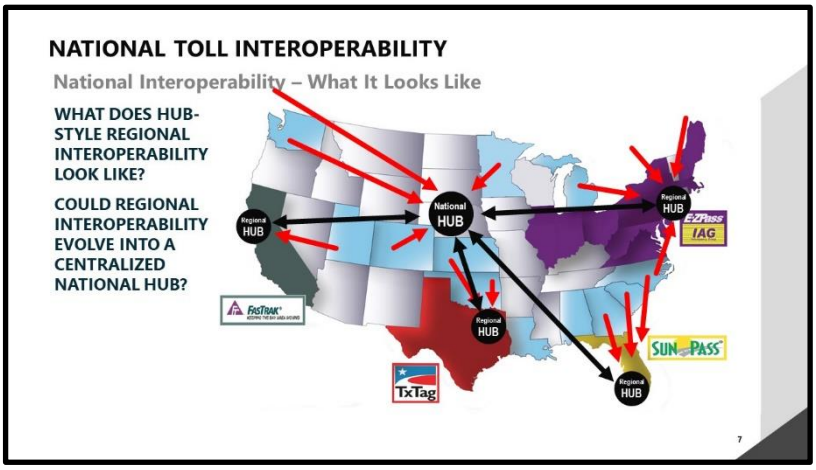
- **Registered Account Types - Transponder & Video Based Accounts**
  A description of the types of accounts used for users who voluntarily register their personal and payment information with account management organizations for use in pre-paid and post-paid toll collection.
- **Unregistered Account Types - Video/License Plate Based Accounts**
  A review of the common account types used by account management organizations for post-paid toll collection.

Business Rules

An example set of typical business rules for the charging and collection of tolls for ETC customers, the typical types of ETC transactions generated by the business rules, the associated flow of ETC transactions and an example of the customer experience within the ETC and toll violation process.

- **Example ETC/VTC and Violation Transaction Flow**
  An example of how business rules are used to manage the flow of toll transactions from the roadside through the back-office to the final conclusion of the toll collection process.
- **Example Unregistered Tolling and Violation Process**
  An example of how business rules are used to reduce receivables as transactions are billed and the customer interacts with the toll collector.

Video 6. US National Toll Interoperability (28:35)



This video reviews the history and current status of toll interoperability within the US.

<u>Toll Interoperability Challenges</u> – Technical & Institutional

A historical overview of the technical and institutional problems faced by the toll industry in creating a uniform national interoperability process for the US including the following issues:

- **Multiple Toll Organizations and Brands**
- **Different Toll Technologies**
- **Lack of Toll Agency Resources**
- **Lack of US Toll Financial Infrastructure**

<u>National Interoperability (NIOP) Committee Solutions</u>

A brief look at the NIOP Committee Goal and Objectives to address the US Interoperability challenges.

<u>NIOP Committee Approach for Overcoming Disparities</u>

A discussion of the NIOP committee solutions for the following:

- **Disparate Technologies**
- **Institutional Issues**
- **Hub-Style Interoperability**

<u>Regional Hub Example – How a Toll Clearinghouse Works</u>

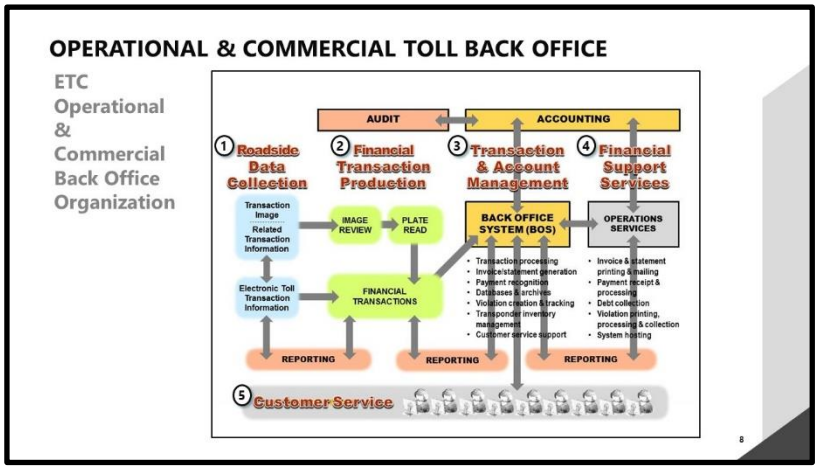
A discussion of the overall approach to developing and operating central clearinghouses for the exchange and settlement of interoperable tolls.

- **Regional Interoperability Hubs** – and look at the structure of a regional toll hub and the potential client organizations.
- **Typical Regional Hub Business Rules Using the Guaranteed Payment Model** – a typical set of business rules and the process for exchanging interoperable toll transactions based on the guaranteed payment model used by most tolling regions.
- **Financial Settlement** – an explanation of an example approach for settling funds owed after the exchange of toll transactions has been verified within a clearinghouse.

<u>Status of US Interoperability as of 2021</u> – an overview of the approach and progress to solving US interoperability through the end of 2021.

Video 7. Operational & Commercial Back Office (18:28)

A description of the five major components of a toll back office and their responsibilities.



Five Components of the ETC Operational & Commercial Back Office – The five major activities associated with a toll back office and how they work together to ensure the proper collection of tolls include:

- **Roadside Data Collection**
- **Financial Transaction Production**
- **Transaction & Account Management**
- **Financial Support Services**
- **Customer Service**

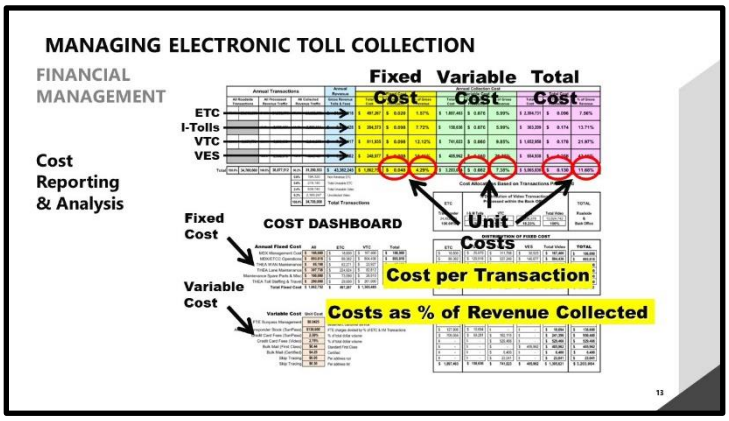
Reporting and Auditing

How the organization of the back-office and the flow of data affects the reporting, reconciliation, and auditing of toll transactions.

Organizing for the Procurement of Back-Office Systems and Operations

A discussion of the various organizational approaches for toll collection found in RFPs and toll collection contracts.

Video 8. Image Review & Financial Management (24:12)



The keys to successfully managing the collection of electronic tolls are to first have a clear understanding of the video toll collection process and how to evaluate that performance and then to be able to account for all of the steps required to process toll transactions and collect the toll revenues.

Evaluating Video System Performance

This segment discusses methods for understanding and evaluating video performance.

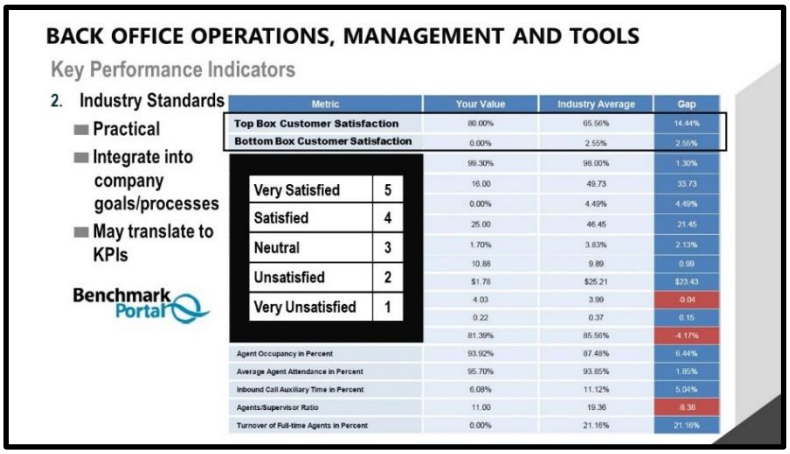
- **Image Processing Tools & Measurement**
  A short discussion of the approach to measuring the accuracy and level of automation of manual and automated methods used in video toll collection.
- **Typical Contractual Video Performance Requirements**
  An overview of the types of accuracy and automation requirements often found in RFPs and a presentation of how requirements translate into outcomes.

Financial Management

An overview of a typical financial model that allows managers to track, report and analyze the movement of transaction data and account for the revenue and costs to process transactions and collect the funds.

- **Waterfall Model for Transaction Processing**
- **Revenue & Reporting Analysis**
- **Cost Reporting & Analysis**

Video 9. Back-Office Operations - Managing & Measuring Performance (19:09)



Managing the toll collection process also involves the management and evaluation of employees, systems and processes. This module presents an overview of back-office operations with a special focus on the establishment and measurement of the key performance indicators for the personnel and systems involved in electronic toll collection and customer service. The discussion includes the following:

Key Performance Indicators (KPI)

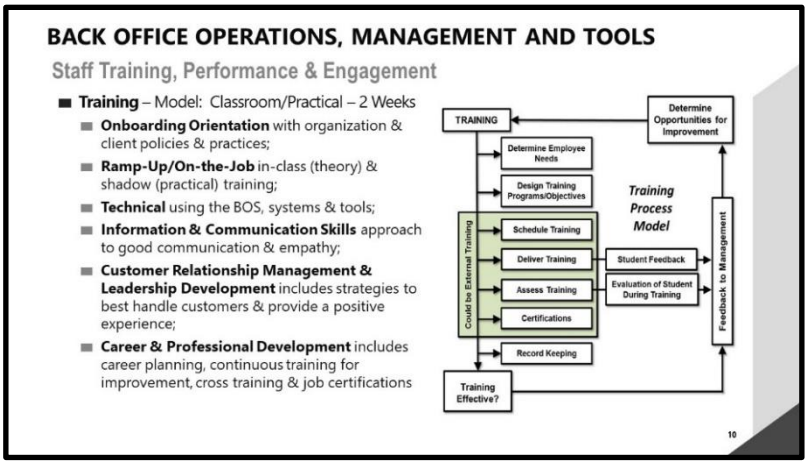
KPI Requirements

Industry Standards

KPI Measurement & Reporting

KPI Analysis

Video 10. Back Office Operations – Managing People for High Performance (16:05)



Training

This segment looks at a typical training model and how the program may be evaluated against a set of instruction objectives.

- **Training Model**
- **Program Evaluation**
- **Objectives of Instruction**

Performance Measurement

Measuring staff performance is a must if there is to be on-going improvement in both the individual employees and the teams within the back office. This segment discusses the following key elements that can lead to continuous improvement of a toll back office.

- **Job Descriptions**
- **Personal Performance Indicators (PPI)**
- **Process Mapping**
- **Scorecards**
- **Coaching & Corrective Action**
- **Basis for Individual Awards**
- **Basis for Team Awards**

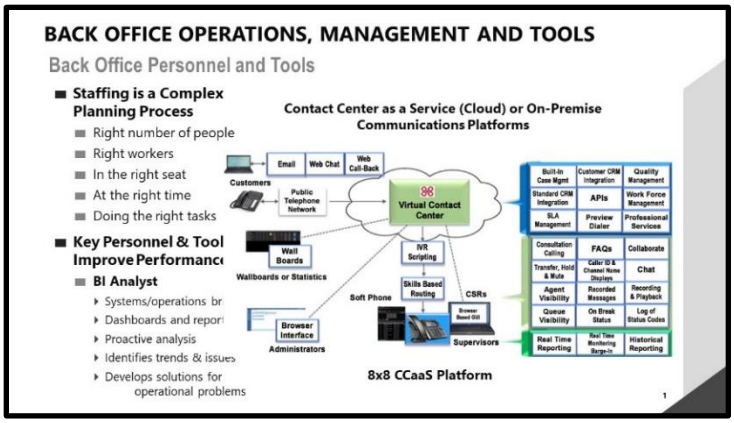
Employee Engagement

Happy employees typically provide high quality production and service. This segment presents a short discussion of those items that are effective in leading to satisfied employees.

- **Career Development**
- **Awards**
- **Staff Involvement**
- **Employee Feedback**

Video 11. Back Office Operations – Management Methods & Tools (47:26)

The management of a toll back office also involves the employment of key middle managers and professionals and the use of technology (machines and software) in support of the back -office and methods to enhance staff performance as well as improve the operational efficiency of the entire operation to include:



Personnel and Tools to Enhance Back-Office Performance

- **HR Management & Staffing**

  In addition to the Training Manager, this discussion identifies key management personnel and activities that often are not included in RFPs – but are clearly beneficial to the success of a large toll back-office operation to include:

  - **Human Resources Management**

    A description of the role and responsibilities of a human resource manager and the human resource function within a toll back-office operation. The discussion includes suggestions from SHRM about the appropriate span-of-control for managers in this type of customer service center (CSC) environment.

  - **Workforce Management & Analysis**

    The role of the Workforce Analyst in developing and maintaining the appropriate staffing in the CSC using WFM software and the CSC communications platform to provide intra-day measurements and projections of current and future staffing that are based on the ERLANG method.

  - **Communications Platform**

    A discussion of a modern communications platform and how it interacts with the customer service representatives and produces information used by management to help the workforce analysis and the BI analyst perform their duties.

  - **Business Intelligence Analysis**

    How a Business Intelligence Analyst helps the toll back-office management and clients to better understand current operations by producing real-time reports and dashboards and to better prepare for the future by projecting needs.

  - **Quality Management, Analysis & Back-Office Quality**

    This discussion includes a high-level description of a quality program within a toll back office, an overview of quality management and the key elements related to implementing quality in a toll back-office operation and an example approach to quality monitoring.

Back Office Tools & Innovations

An overview of various software and hardware products and services that improve support the decision-making within a toll back office.

- **Enhancing Customer Service**
  - Artificial Intelligence & Robots
  - Visual IVR
  - Remote Kiosks & Systems
  - Remote Payments & Systems
- **Improving Operational Efficiency**
  - Hardware & Software Support
  - Lessons from COVID