QA TECHNOLOGIES

QAT flow

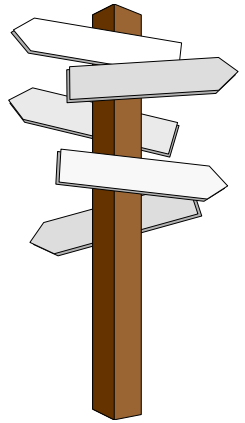
Edge 2006

Questions Answered. Solutions Provided.

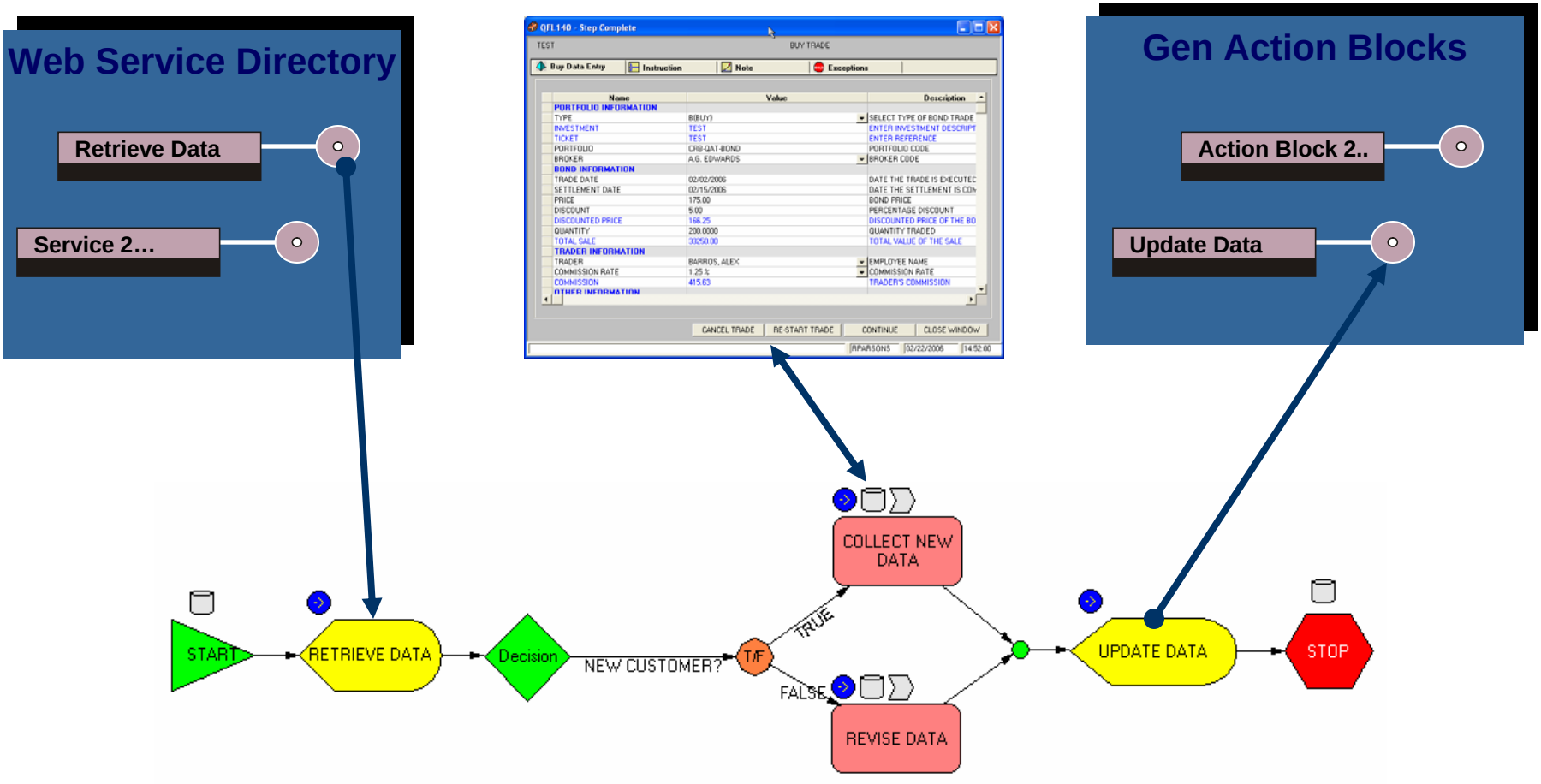
QAT Flow – Two Solutions In One

QAT Flow is a dual purpose process automation engine

- For the IT Community:
  - ***Business Process Orchestration***
  - ***Seamless Integration with Gen Action Blocks and/or Web Services***
  - ***Key Technology for Renewing your Legacy COBOL and/or Gen Applications*** *(See the Legacy Renewal Presentation from QAT)*
- For the Business Community:
  - ***Work Flow Management System***
  - ***Graphical Process Modeling***
  - ***Automated Data Collection***



Seamless Integration and Automated Data Collection

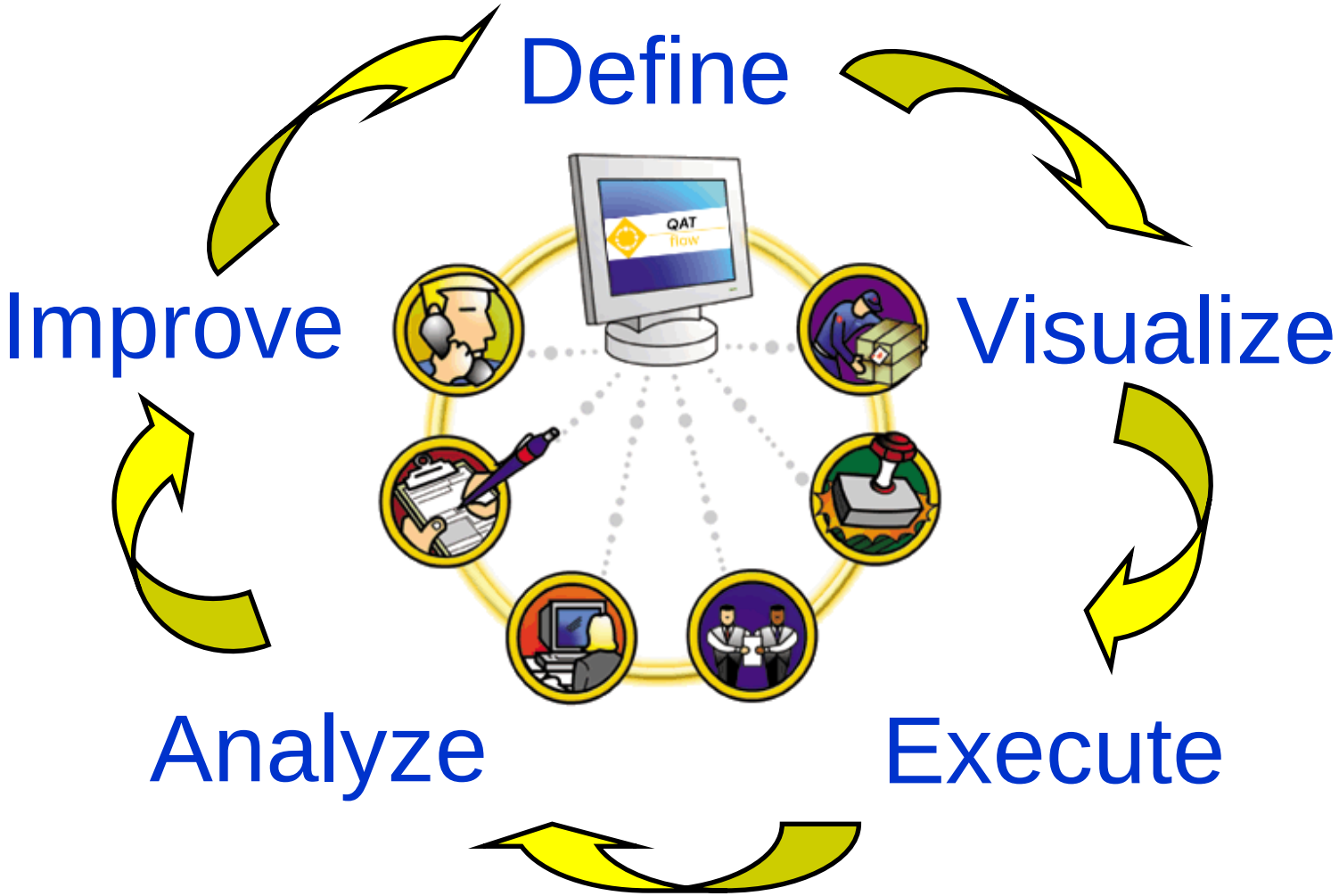


QAT Flow
Workflow Management

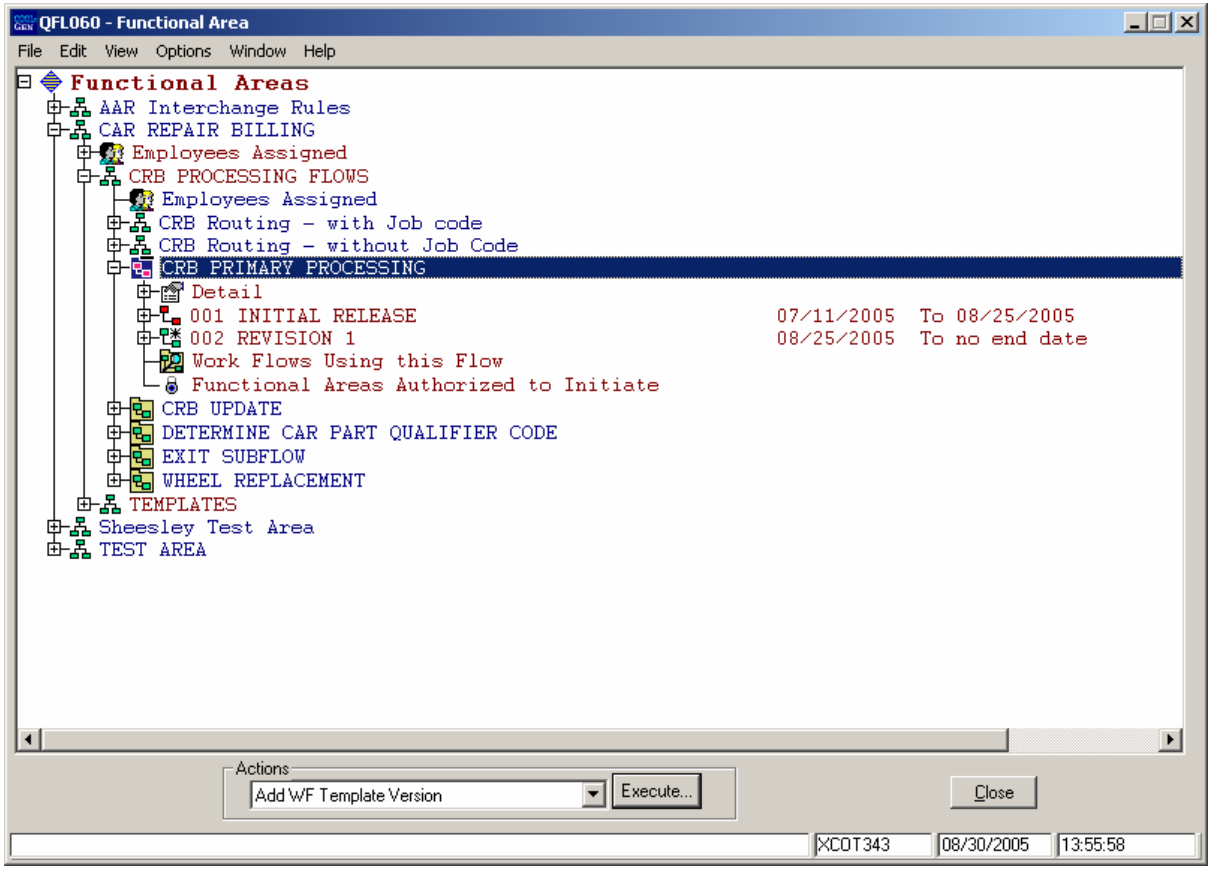
QAT Flow allows for the definition, execution and management of workflows

- **A simple graphical environment where business users are able to model interactive or transactional business processes**
- **A software engine that interprets the business users' process definition, interacts with workflow participants and, where required, invoke the use of IT tools, applications and integration services**
- **A queue administration function that permits work flow participants to actively manage work load (inboxes)**
- **A robust integration platform that results in tight integration of transactions across multiple systems to create a single automated business transaction**

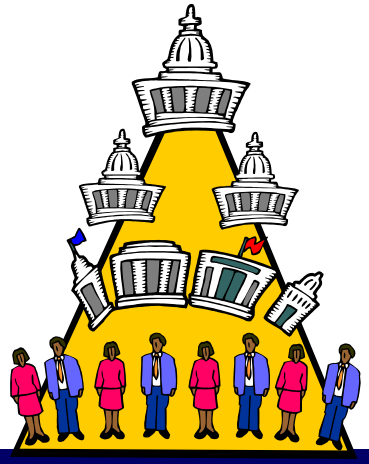
QAT Flow – Development Cycle



Define



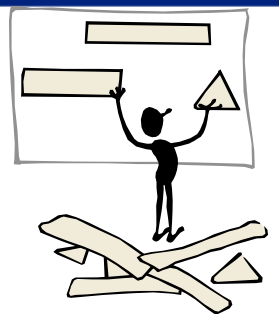
- **Functional Areas**
- **Assign Employees**
- **Work Flows**
- **Versions**
- **Parameters**
- **External Links**



Define

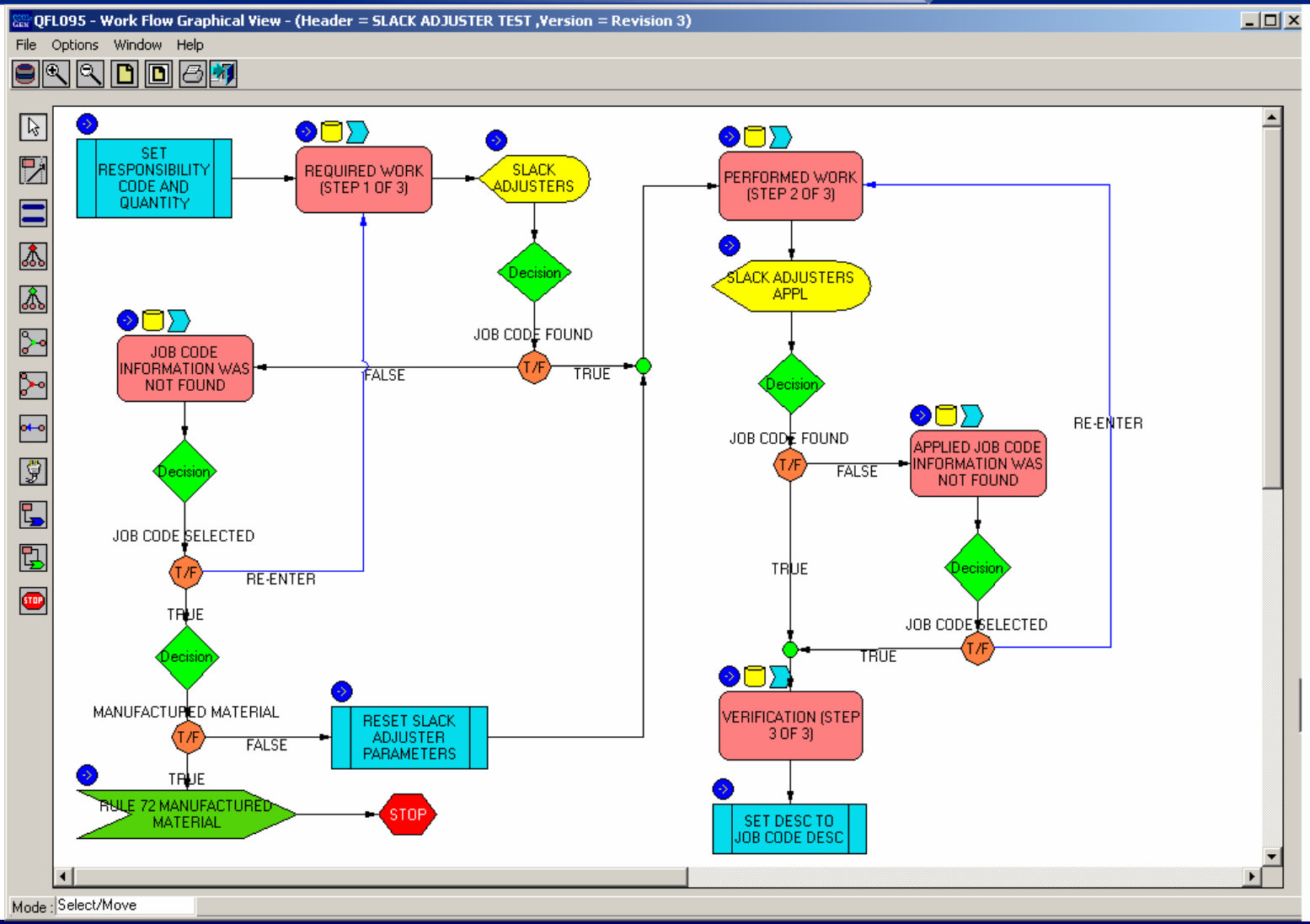
- **Functional Areas –** Logical groupings for business functions. Can be based on organizational roles or business activities. Functional Areas own Work Flows and are assigned the responsibility to complete Work Flow Steps.
- **Assign Employees –** Employees are assigned to Functional Areas and are given roles such as administrator, manager or worker
- Work Flows – Business processes that have been modeled in QAT Flow.
- **Versions –** Version control is provided to maintain a history of previous versions of the work flow, identified the current version and allow for planning and scheduling of future versions.
- **Parameters –** Parameters are created to support the collection and presentation of business data.
- **External Links-** Allows existing applications and services to be integrated with the work flows.

Visualize and Graphically Design



- **Graphical interface to model business procedures and communicate business logic on a single diagram**
- **Work flow immediately available for execution…no additional programming required**
- **XML import/export of work flow definition compliant with Work Flow Management Coalition standards**

Visualize and Graphically Design



Visualize and Graphically Design

Work Flow Design includes the following Object Types:

- **Basic Steps – These are the points where the Work Flow interacts with human participants. Steps are assigned to Functional Areas and employees within the Functional Area perform the work.**
- **Decision Control – Two types of decision branching are provided. True/False branching based on the evaluation of business rules and Switch branching which is similar to a "case of" statement.**
- **Junction Control – When parallel paths are joined back together, "or" junctions allow the process to continue as soon as the 1st branch completes. "And" junctions prevent the work flow from continuing until all branches are complete.**
- **Re-routes – Allows the work flow to be returned to a previous step for re-execution.**
- **Sub-Flow – Allows one work flow to execute another work flow. Data can be passed to and returned from the sub-flow.**
- **Externals – Allows the execution of applications and services outside of QAT Flow. Data can be passed to and returned from the sub-flow.**

Execute

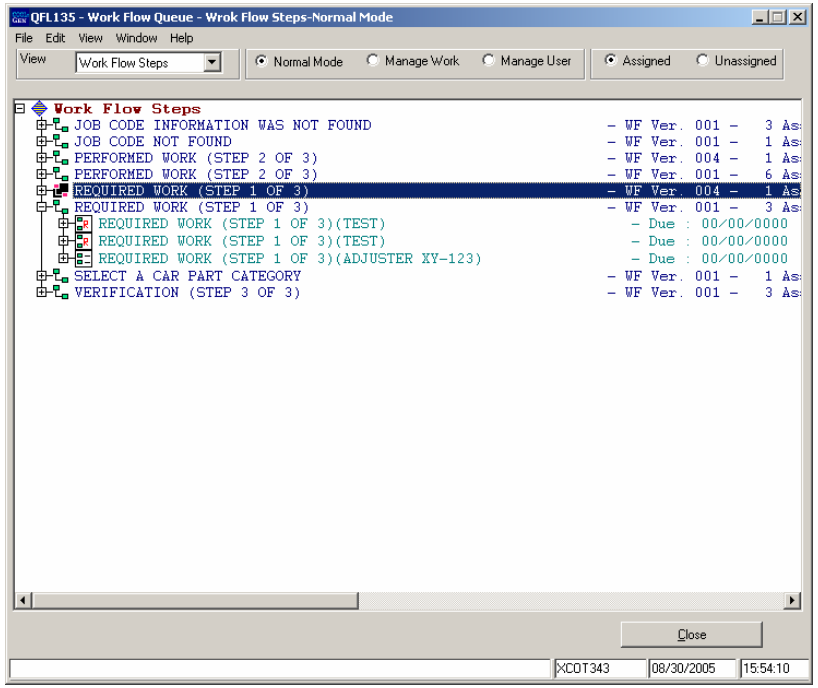
- **Work flows can be manually initiated from QAT Flow or automatically from external applications.**
- **Work is managed through a robust work queue**
- **Advanced user interface … only 2 windows to learn for typical customers**
- **Email integration (Critical in most enterprises)**
- **Management tools prevent work from "slipping through the cracks"**

Execute

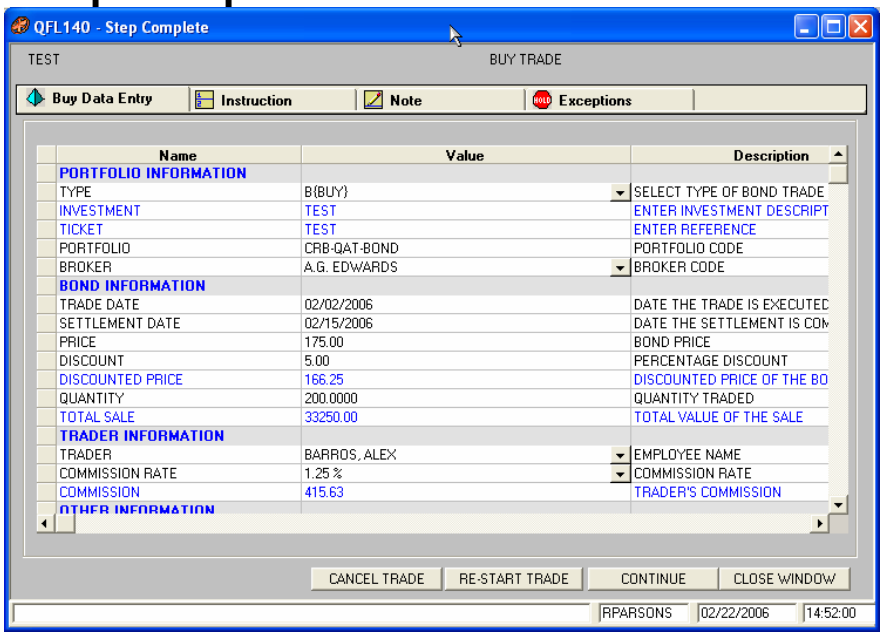
- **Extensive Work Queue**
  - ✓ Identify work to be completed or work assigned
  - ✓ Work can be assigned by a manager
  - ✓ Multiple sorts and filters
- **Complete Management Control**
  - ✓ Managers can assign/re-assign work
  - ✓ Can control due dates
  - ✓ Progress can be monitored
  - ✓ Managers can complete tasks if required
- **Step Completion Window**
  - ✓ Provides a common window to complete all work.
  - ✓ Captures data related to a step – without form design or scripting
  - ✓ Provides instructions / captures notes
  - ✓ Allows re-routing a step, pausing a step indefinitely and restarting a step
- **Management Tools**
  - ✓ Managers can sort work queues and monitor work
  - ✓ Batch jobs can generate notification messages when work is past due.

Execute

Work Queue Management

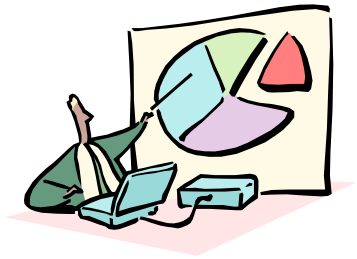


Fully Configurable
Step Completion / Data Collection Window

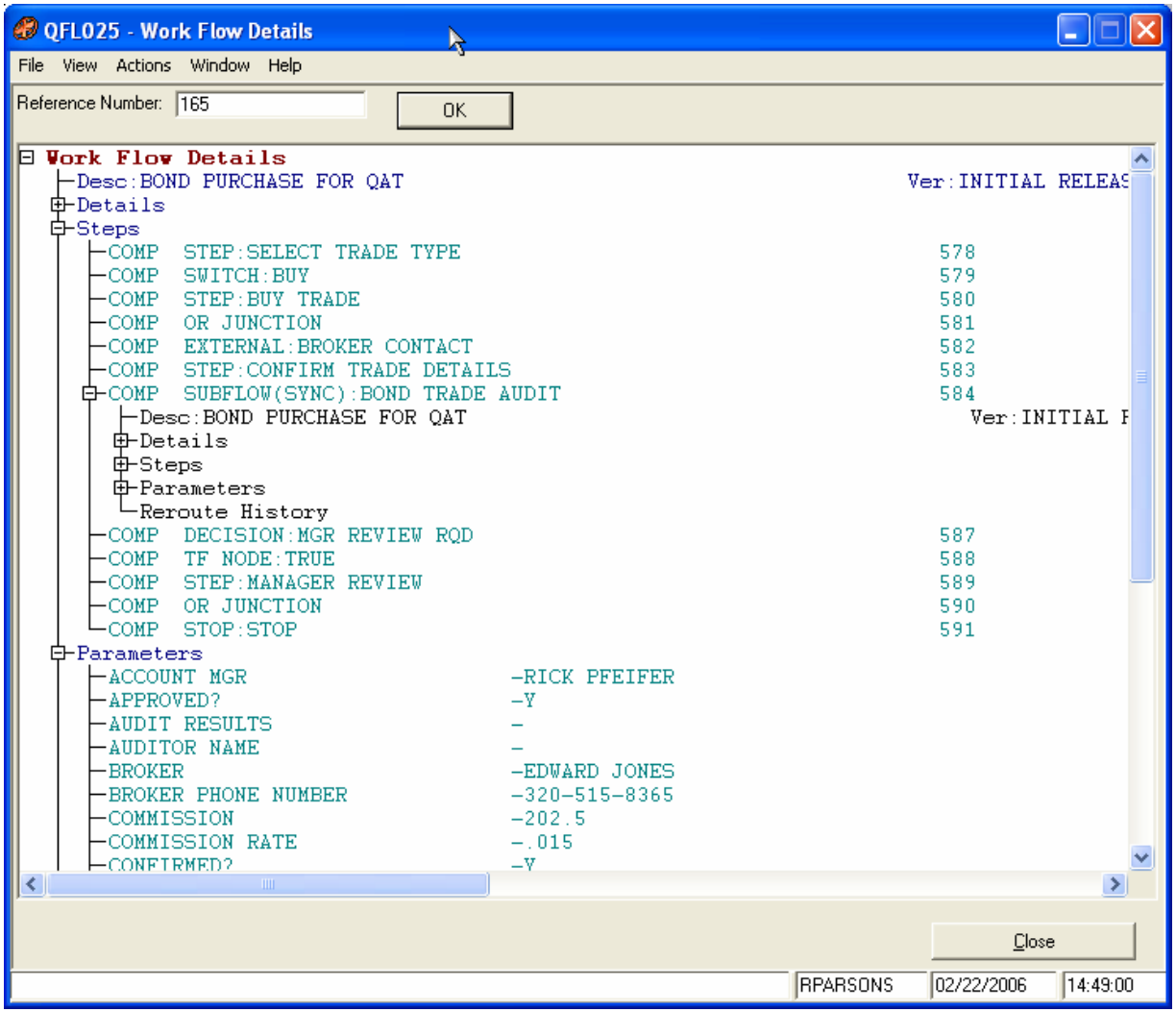


Analyze

- **Management review -** Managers are allow to monitor all of the work assigned to a Functional Area and the work assigned to individual members of the Functional Area. Current views and historical views are available.
- **"Who, what and when" tracked -** Timestamps and user IDs are captured for all aspects of an executing Work Flow. This data can be accessed through custom reports.
- **Trend analysis -** Over time, as the Work Flow is executed, you will be able to calculate average execution times for Work Flows and individual Work Flow Steps which can be used to monitor the performance of individuals and Functional Areas. These averages can also be used to evaluate the impact of changes made to a Work Flow.



Analyze



Improve

- **Robust version control**
  - ✓ Versions are maintained for history
  - ✓ Versions can be scheduled for active and expiration dates
  - ✓ Transition from 1 version to the next is seamless
  - ✓ A Work Flow started by one version will be completed by that version
  - ✓ Previous versions can be re-activated if necessary.
  - ✓ Old versions can be re-run with historical data.
- **Historical monitoring for iterative improvement**
- **Improvements can be made as fast as the business requires and IT only gets involved when new or updated services are required**

Architecture

- **QAT Flow is an AllFusion® Gen Application.**
  - **The design side runs as client/server**
  - **The runtime side runs as client/server or web (Using QAT WebDaptive)**
- **Component Implementation**
  - ✓ Administrative Operations
  - ✓ Runtime Operations (Primary Integration Point)
  - ✓ Approximately 223 Public Operations Available
- **Fully Functional Advantage Gen User Interface**
  - ✓ Component architecture allows customer to consume the component into any existing application as a Gen Component or as a Web Service.

Car Repair Billing (CRB)

Background

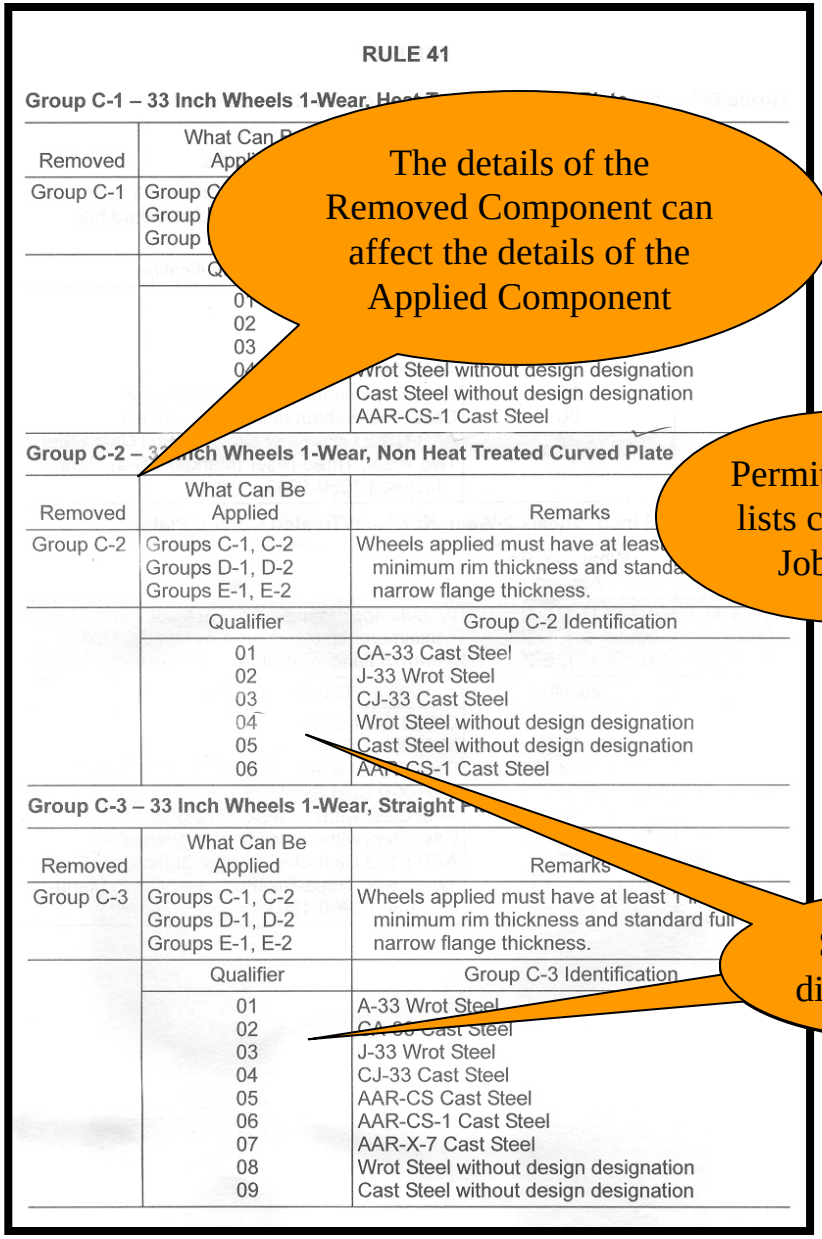
- A large railroad needed to automate their car repair billing process.
- When foreign owned cars are repaired, the owner of the car can be billed for those repairs.
- The billing process is governed by the Association of American Railroads (A.A.R.) Interchange Rules.
- Billing records are processed by a third party billing partner.
- The collection of data for Car Repair Billing is being integrated with the Maintenance Work Order process (AllFusion® Gen Application). This information is then transmitted to the billing partner for processing.

Challenges

Association of American Railroads (A.A.R.) Interchange Rules

- Strict standards that must be correctly applied for billing.
- 55 Separate Rules for car components and material.
- 1200+ Job Codes
- Field Manual and Office Manual - Over 1000 pages of rule data.

Field Manual and Office Manual



RULE 41

Group C-1 – 33 Inch Wheels 1-Wear, Heat T

Removed	What Can B Appl	
Group C-1	Group C Group Group	
	Q	
	01	
	02	
	03	
	04	Wrot Steel without design designation
		Cast Steel without design designation
		AAR-CS-1 Cast Steel

Group C-2 – 33 Inch Wheels 1-Wear, Non Heat Treated Curved Plate

Removed	What Can Be Applied	Remarks
Group C-2	Groups C-1, C-2 Groups D-1, D-2 Groups E-1, E-2	Wheels applied must have at leas minimum rim thickness and standa narrow flange thickness.
	Qualifier	Group C-2 Identification
	01	CA-33 Cast Steel
	02	J-33 Wrot Steel
	03	CJ-33 Cast Steel
	04	Wrot Steel without design designation
	05	Cast Steel without design designation
	06	AAR-CS-1 Cast Steel

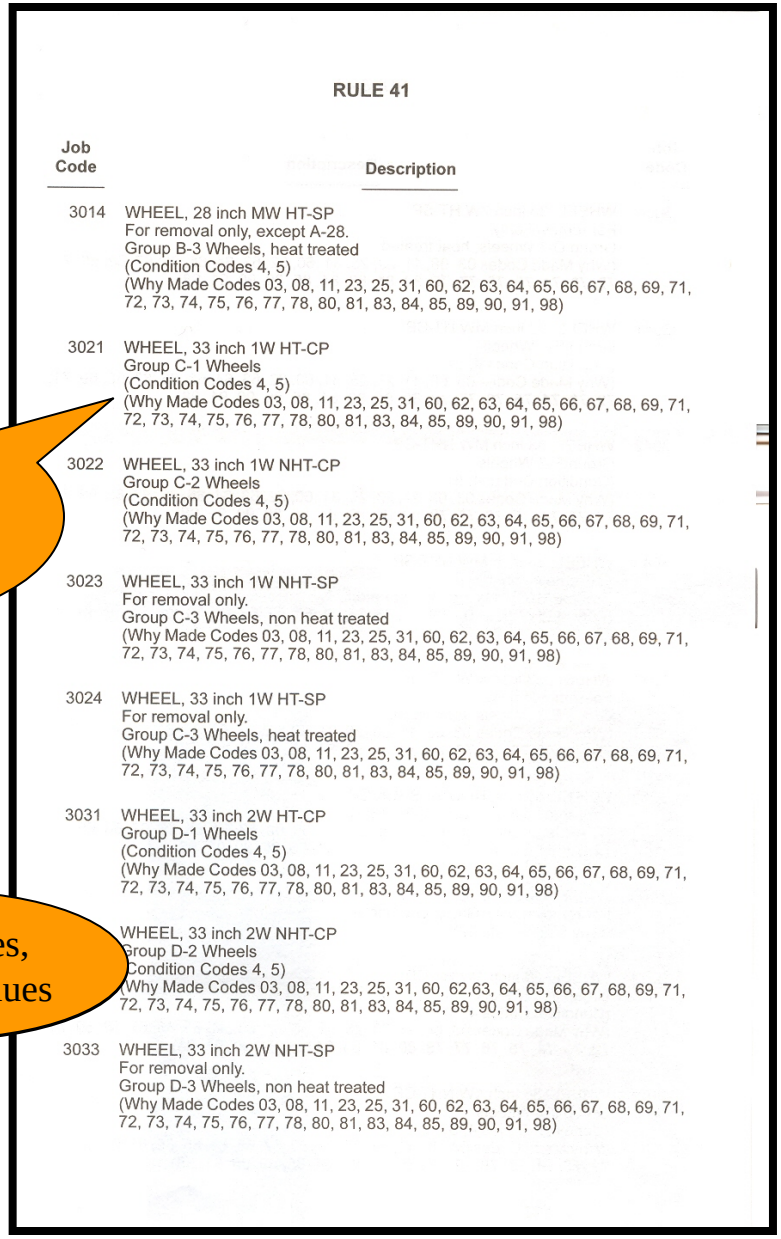
Group C-3 – 33 Inch Wheels 1-Wear, Straight Fl

Removed	What Can Be Applied	Remarks
Group C-3	Groups C-1, C-2 Groups D-1, D-2 Groups E-1, E-2	Wheels applied must have at least 1 minimum rim thickness and standard full narrow flange thickness.
	Qualifier	Group C-3 Identification
	01	A-33 Wrot Steel
	02	CA-33 Cast Steel
	03	J-33 Wrot Steel
	04	CJ-33 Cast Steel
	05	AAR-CS Cast Steel
	06	AAR-CS-1 Cast Steel
	07	AAR-X-7 Cast Steel
	08	Wrot Steel without design designation
	09	Cast Steel without design designation

The details of the Removed Component can affect the details of the Applied Component

Permitted value lists change by Job Code

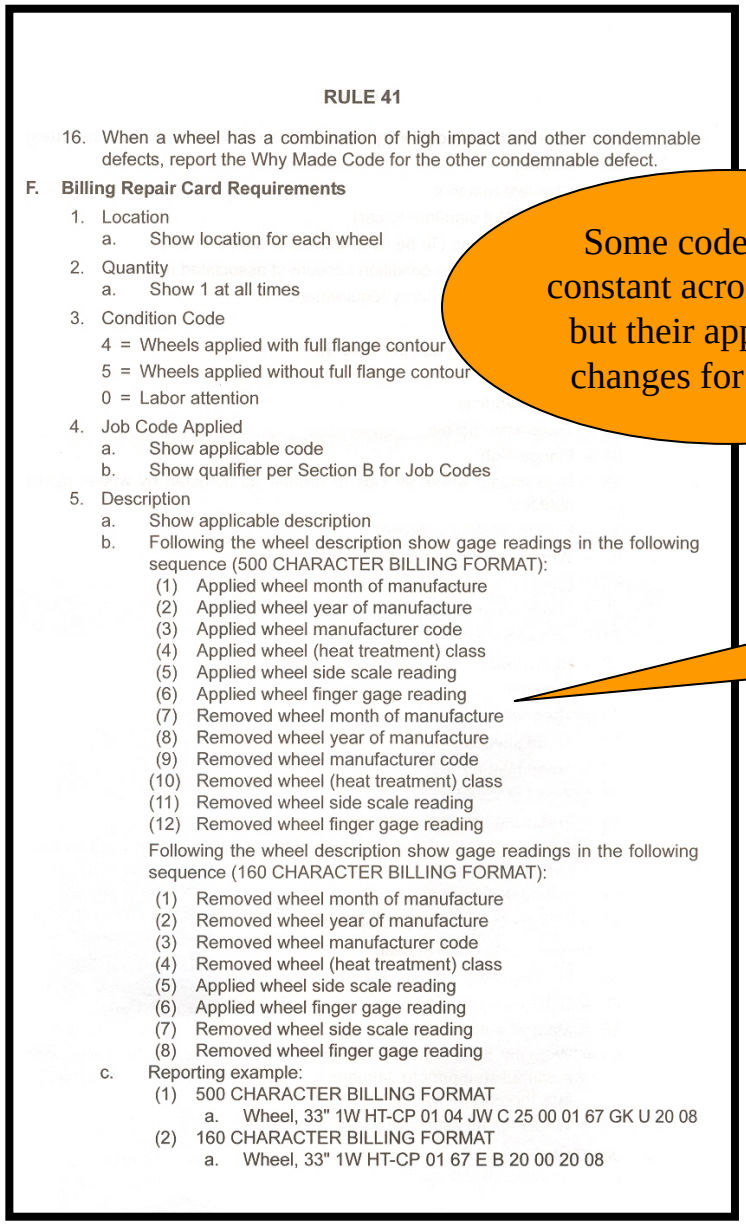
Same codes, different values



RULE 41

Job Code	Description
3014	WHEEL, 28 inch MW HT-SP For removal only, except A-28. Group B-3 Wheels, heat treated (Condition Codes 4, 5) (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3021	WHEEL, 33 inch 1W HT-CP Group C-1 Wheels (Condition Codes 4, 5) (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3022	WHEEL, 33 inch 1W NHT-CP Group C-2 Wheels (Condition Codes 4, 5) (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3023	WHEEL, 33 inch 1W NHT-SP For removal only. Group C-3 Wheels, non heat treated (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3024	WHEEL, 33 inch 1W HT-SP For removal only. Group C-3 Wheels, heat treated (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3031	WHEEL, 33 inch 2W HT-CP Group D-1 Wheels (Condition Codes 4, 5) (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
	WHEEL, 33 inch 2W NHT-CP Group D-2 Wheels Condition Codes 4, 5) (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62,63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)
3033	WHEEL, 33 inch 2W NHT-SP For removal only. Group D-3 Wheels, non heat treated (Why Made Codes 03, 08, 11, 23, 25, 31, 60, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 89, 90, 91, 98)

Field Manual and Office Manual



RULE 41

16. When a wheel has a combination of high impact and other condemnable defects, report the Why Made Code for the other condemnable defect.

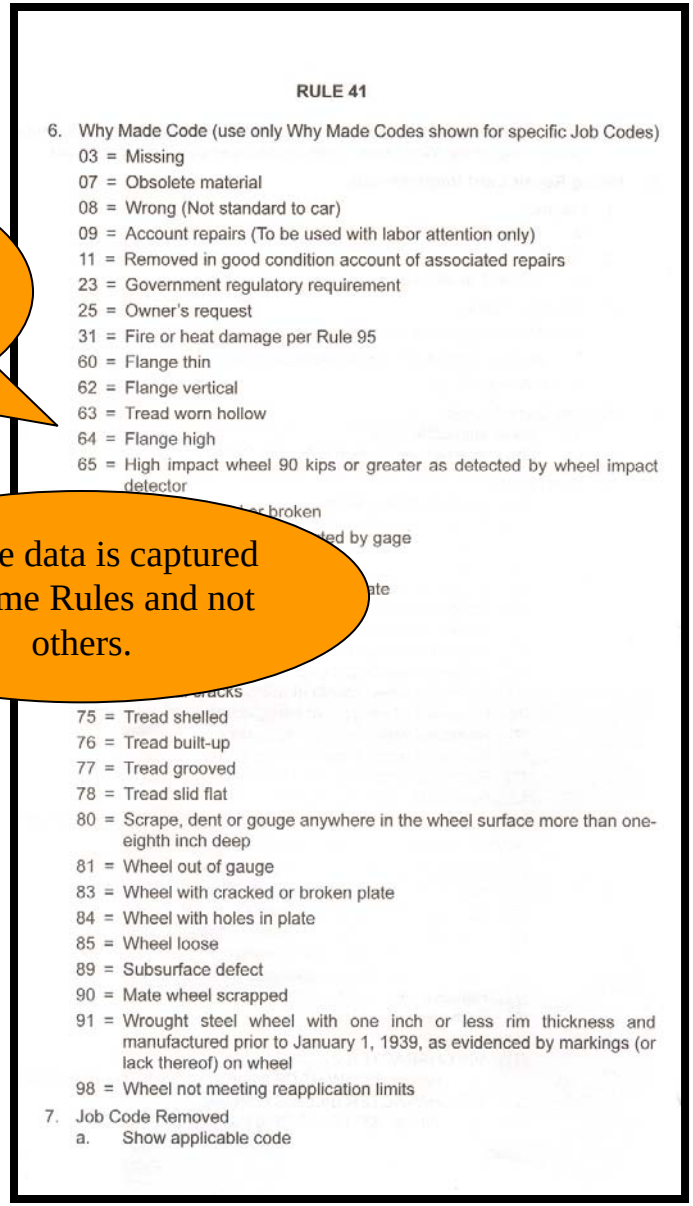
F. Billing Repair Card Requirements

1. Location
   a. Show location for each wheel
2. Quantity
   a. Show 1 at all times
3. Condition Code
   4 = Wheels applied with full flange contour
   5 = Wheels applied without full flange contour
   0 = Labor attention
4. Job Code Applied
   a. Show applicable code
   b. Show qualifier per Section B for Job Codes
5. Description
   a. Show applicable description
   b. Following the wheel description show gage readings in the following sequence (500 CHARACTER BILLING FORMAT):
      (1) Applied wheel month of manufacture
      (2) Applied wheel year of manufacture
      (3) Applied wheel manufacturer code
      (4) Applied wheel (heat treatment) class
      (5) Applied wheel side scale reading
      (6) Applied wheel finger gage reading
      (7) Removed wheel month of manufacture
      (8) Removed wheel year of manufacture
      (9) Removed wheel manufacturer code
      (10) Removed wheel (heat treatment) class
      (11) Removed wheel side scale reading
      (12) Removed wheel finger gage reading

      Following the wheel description show gage readings in the following sequence (160 CHARACTER BILLING FORMAT):
      (1) Removed wheel month of manufacture
      (2) Removed wheel year of manufacture
      (3) Removed wheel manufacturer code
      (4) Removed wheel (heat treatment) class
      (5) Applied wheel side scale reading
      (6) Applied wheel finger gage reading
      (7) Removed wheel side scale reading
      (8) Removed wheel finger gage reading
   c. Reporting example:
      (1) 500 CHARACTER BILLING FORMAT
         a. Wheel, 33" 1W HT-CP 01 04 JW C 25 00 01 67 GK U 20 08
      (2) 160 CHARACTER BILLING FORMAT
         a. Wheel, 33" 1W HT-CP 01 67 E B 20 00 20 08

Some codes remain constant across all rules, but their applicability changes for each rule

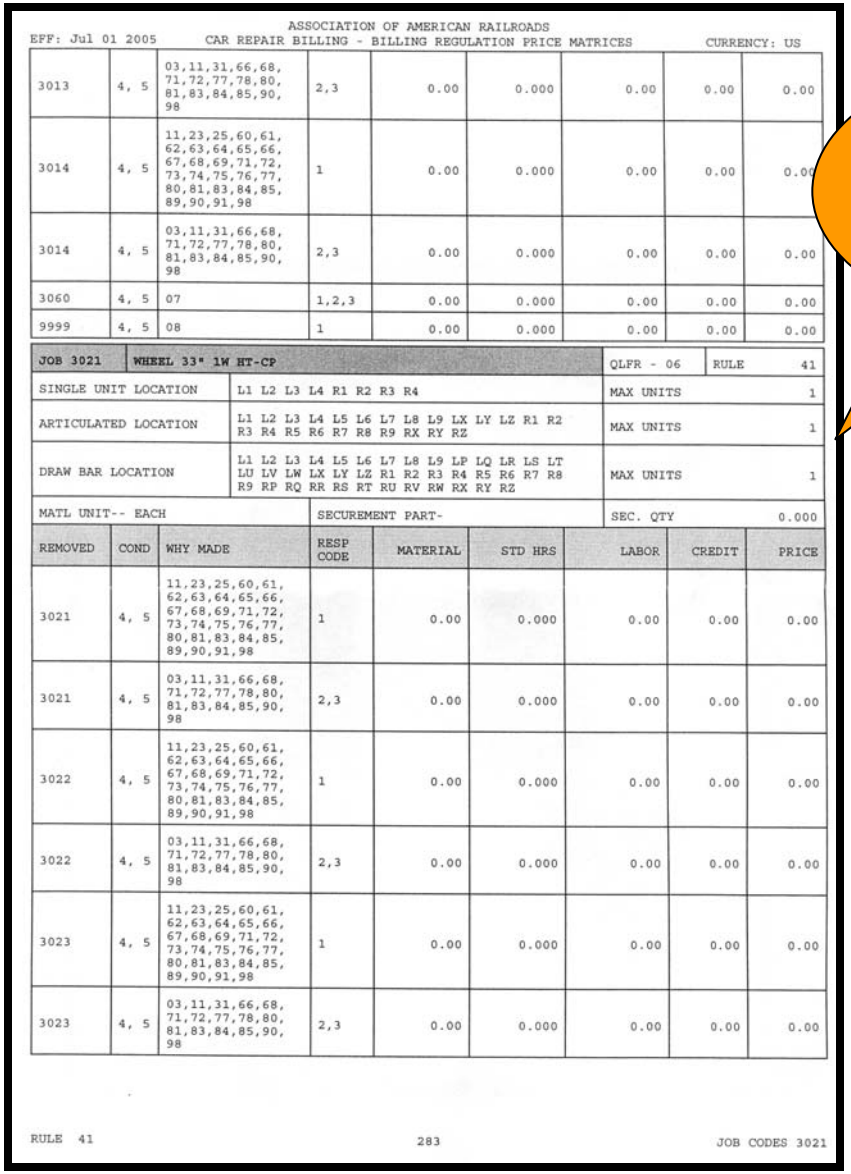
Unique data is captured for some Rules and not others.



RULE 41

6. Why Made Code (use only Why Made Codes shown for specific Job Codes)
   03 = Missing
   07 = Obsolete material
   08 = Wrong (Not standard to car)
   09 = Account repairs (To be used with labor attention only)
   11 = Removed in good condition account of associated repairs
   23 = Government regulatory requirement
   25 = Owner's request
   31 = Fire or heat damage per Rule 95
   60 = Flange thin
   62 = Flange vertical
   63 = Tread worn hollow
   64 = Flange high
   65 = High impact wheel 90 kips or greater as detected by wheel impact detector
   broken
   ed by gage
   te
   acks
   75 = Tread shelled
   76 = Tread built-up
   77 = Tread grooved
   78 = Tread slid flat
   80 = Scrape, dent or gouge anywhere in the wheel surface more than one-eighth inch deep
   81 = Wheel out of gauge
   83 = Wheel with cracked or broken plate
   84 = Wheel with holes in plate
   85 = Wheel loose
   89 = Subsurface defect
   90 = Mate wheel scrapped
   91 = Wrought steel wheel with one inch or less rim thickness and manufactured prior to January 1, 1939, as evidenced by markings (or lack thereof) on wheel
   98 = Wheel not meeting reapplication limits
7. Job Code Removed
   a. Show applicable code

Field Manual and Office Manual



ASSOCIATION OF AMERICAN RAILROADS

EFF: Jul 01 2005 CAR REPAIR BILLING - BILLING REGULATION PRICE MATRICES CURRENCY: US

3013	4, 5	03,11,31,66,68, 71,72,77,78,80, 81,83,84,85,90, 98	2,3	0.00	0.000	0.00	0.00	0.00
3014	4, 5	11,23,25,60,61, 62,63,64,65,66, 67,68,69,71,72, 73,74,75,76,77, 80,81,83,84,85, 89,90,91,98	1	0.00	0.000	0.00	0.00	0.00
3014	4, 5	03,11,31,66,68, 71,72,77,78,80, 81,83,84,85,90, 98	2,3	0.00	0.000	0.00	0.00	0.00
3060	4, 5	07	1,2,3	0.00	0.000	0.00	0.00	0.00
9999	4, 5	08	1	0.00	0.000	0.00	0.00	0.00

JOB 3021	WHEEL 33" 1W HT-CP	QLFR - 06	RULE 41
SINGLE UNIT LOCATION	L1 L2 L3 L4 R1 R2 R3 R4	MAX UNITS	1
ARTICULATED LOCATION	L1 L2 L3 L4 L5 L6 L7 L8 L9 LX LY LZ R1 R2 R3 R4 R5 R6 R7 R8 R9 RX RY RZ	MAX UNITS	1
DRAW BAR LOCATION	L1 L2 L3 L4 L5 L6 L7 L8 L9 LP LQ LR LS LT LU LV LW LX LY LZ R1 R2 R3 R4 R5 R6 R7 R8 R9 RP RQ RR RS RT RU RV RW RX RY RZ	MAX UNITS	1
MATL UNIT-- EACH	SECUREMENT PART-	SEC. QTY	0.000

REMOVED	COND	WHY MADE	RESP CODE	MATERIAL	STD HRS	LABOR	CREDIT	PRICE
3021	4, 5	11,23,25,60,61, 62,63,64,65,66, 67,68,69,71,72, 73,74,75,76,77, 80,81,83,84,85, 89,90,91,98	1	0.00	0.000	0.00	0.00	0.00
3021	4, 5	03,11,31,66,68, 71,72,77,78,80, 81,83,84,85,90, 98	2,3	0.00	0.000	0.00	0.00	0.00
3022	4, 5	11,23,25,60,61, 62,63,64,65,66, 67,68,69,71,72, 73,74,75,76,77, 80,81,83,84,85, 89,90,91,98	1	0.00	0.000	0.00	0.00	0.00
3022	4, 5	03,11,31,66,68, 71,72,77,78,80, 81,83,84,85,90, 98	2,3	0.00	0.000	0.00	0.00	0.00
3023	4, 5	11,23,25,60,61, 62,63,64,65,66, 67,68,69,71,72, 73,74,75,76,77, 80,81,83,84,85, 89,90,91,98	1	0.00	0.000	0.00	0.00	0.00
3023	4, 5	03,11,31,66,68, 71,72,77,78,80, 81,83,84,85,90, 98	2,3	0.00	0.000	0.00	0.00	0.00

RULE 41 283 JOB CODES 3021

Billing requirements from the Office Manual add to the complexity.

Challenges

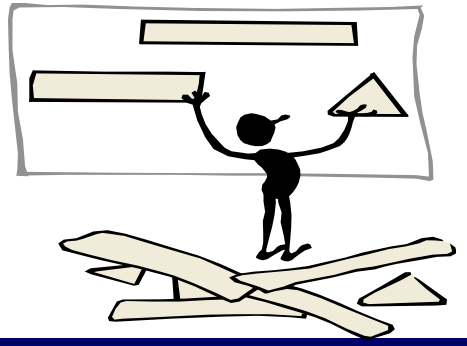
Customer Business Knowledge Required

- Difficult to “hard code” business rules without detailed knowledge of the maintenance process.
- Design sessions and knowledge transfer would have taken too much time.
- Needed a non-programming / dynamic solution for the customer to directly input the business rules.

Challenges

Frequent and Rapid Changes are Required

- A.A.R updates the manuals quarterly.
- Feedback from field personnel provide interface improvements.
- Design errors are inevitable. Need the ability to rapidly correct.

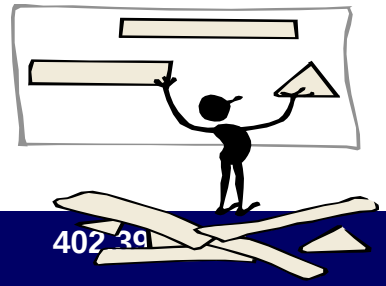


Needed to Think "Outside the Box"

- Use a Work Flow solution to allow the customer to design and maintain the work processes.
- The Work Flows would be used to control the collection of data.
- Integrate it seamlessly with the work order application and provide 2 way data transfer.

How Large was the Effort

- 39 Navigation / Processing flows
- 189 Work Flows written by the customer
- 600 Decision Branches
- 5000 Lines of Dependency Rules
- 400 Data collection steps
- 8 Interfaces to the Work Order Application
- 15 Dynamic Data Management Tables
- 1700+ Work Order Tasks associated with QAT Flow



Staffing and Schedule

- The entire application was developed in QAT Flow and Acceptance Tested in 4 Months.
- 1.5 business resources wrote all of the work flows after a 4 hour tutorial and 1 day training course from QAT.
- 1 part time QAT mentoring resource spent approximately 300 hours over the 4 months assisting with work flow design and product questions.
- 1 part time Gen developer spent approximately 200 hours integrating the work order application with Flow and providing application services (i.e. Gen Action Blocks interacting with the application database).
- The business customer made regular adjustments to the work flow after implementation and continues to maintain the work flow today without IT involvement.

QAT Flow – Benefits

- **Better management of long lifecycle business processes.**
- **Better application integration across the enterprise.**
- **Continuous and rapid business process improvement.**
- **Fewer interoffice slowdowns.**
- **Improved quality of business transactions.**
- **Enforced Accountability.**
- **Increased productivity and reduced costs through expert business process automation.**