TABLE 1: MACHINES TABLE

==========

Description: List of all machines used in the biscuit production line

Total Columns: 5

Primary Key: Machine

Column 1: Machine

Data Type : Text (Variable Length)

Description : Machine name used in the production line

Example Values : Biscuit Boxing Machine, Biscuit Filling Machine,

Biscuit Jam Machine, Biscuit Forming Machine

Nullable : No

Primary Key : Yes

Business Rules : Must be unique for each machine

Column 2: Machine Type

Data Type : Text (Categorical)

Description : Classification of the operation type performed by the machine

Example Values : Boxing, Filling, Forming, Heating, Mixing,

Packaging, Topping

Nullable : No

Primary Key : No

Business Rules : Must be from predefined values

Column 3: Unit

Data Type : Text (Categorical)

Description : Production measurement unit for the machine

Example Values : Case, Biscuits, Packs

Nullable : No

Primary Key : No

Business Rules : Determines how production is calculated for each machine

Column 4: Order

Data Type : Integer

Description : Sequential number showing the machine's position in production line

Example Values : 1, 2, 3, 4, 5, 6, 7

Nullable : No

Primary Key : No

Business Rules : Starts from 1 and increases according to production flow

Column 5: Unit Num Cookies

Data Type : Integer

Description : Number of biscuit pieces in each production unit

Example Values : 1, 6, 24

Nullable : No

Primary Key : No

Business Rules : Used to calculate total production in pieces

==========

TABLE 2: OEE CODES TABLE

==========

Description: OEE codes used to record stoppage states and their reasons

(OEE = Overall Equipment Effectiveness)

Total Columns: 3

Primary Key: OEE Code

Column 1: OEE Code

Data Type : Text (2 Characters)

Description : Short code representing the type of stoppage or state

Example Values : RT, NO, CC, PM

Nullable : No

Primary Key : Yes

Business Rules : Must be exactly 2 characters and unique

Column 2: OEE Descr

Data Type : Text (Variable Length)

Description : Full description of the stoppage type or state

Example Values : Run Time, No Order, Changeover Cleaning, Maintenance

Nullable : No

Primary Key : No

Business Rules : Clarifies the code meaning in detail

Column 3: OEE Category

Data Type : Text (Variable Length)

Description : Detailed classification with code in brackets

Example Values : RT (Run Time), NO (No Order),

CC (Changeover Cleaning), PM (Maintenance)

Nullable : No

Primary Key : No

Business Rules : Combines code and description for easy understanding

==========

TABLE 3: PRODUCTS TABLE

==========

Description: List of all biscuit types produced with packaging details

Total Columns: 4

Primary Key: Product Name

Column 1: Product Name

Data Type : Text (Variable Length)

Description : Commercial name of the biscuit type

Example Values : Jammy Creams, Custard Creams, Bourbon Creams,

Milk Cookies, Chocolate cookies

Nullable : No

Primary Key : Yes

Business Rules : Must be unique for each product

Column 2: Biscuits_PER_PACK

Data Type : Integer

Description : Number of biscuit pieces in each pack

Example Values : 1, 4, 6

Nullable : No

Primary Key : No

Business Rules : Defines small packaging size

Column 3: Biscuits_PER_CASE

Data Type : Integer

Description : Total number of biscuit pieces in a full case

Example Values : 12, 24

Nullable : No

Primary Key : No

Business Rules : = Biscuits_PER_PACK × Number of packs per case

Column 4: Cases Per Pallet

Data Type : Integer

Description : Number of cases placed on one pallet for storage

Example Values : 100, 140, 360

Nullable : No

Primary Key : No

Business Rules : Used for storage and shipping

==========

TABLE 4: MACHINE-PRODUCT TARGET TABLE

==========

Description: Links machines and products and defines target production rate

Total Columns: 4

Primary Key: Key_Machine_Product (Composite)

Column 1: Key_Machine_Product

Data Type : Text (Composite Key)

Description : Unique key combining machine name and product name

Example Values : Biscuit Filling Machine_Jammy Creams,

Biscuit Boxing Machine_Custard Creams

Nullable : No

Primary Key : Yes

Business Rules : Format: {Machine Name}_{Product Name}

Column 2: Machine

Data Type : Text (Foreign Key)

Description : Machine name used in production

Example Values : Biscuit Filling Machine, Biscuit Boxing Machine

Nullable : No

Primary Key : No

Foreign Key : References Machines Table (Machine)

Business Rules : Must exist in Machines table

Column 3: Product

Data Type : Text (Foreign Key)

Description : Product name to be produced

Example Values : Jammy Creams, Custard Creams, Bourbon Creams

Nullable : No

Primary Key : No

Foreign Key : References Products Table (Product Name)

Business Rules : Must exist in Products table

Column 4: TARGET Biscuits per hour

Data Type : Integer

Description : Target number of biscuit pieces to be produced per hour

Example Values : 43200, 51840

Nullable : No

Primary Key : No

Business Rules : Used to calculate efficiency and compare actual performance

==========

TABLE 5: PRODUCTION LOG TABLE

==========

Description: Detailed log of all production and stoppage periods with timestamps

Total Columns: 7

Primary Key: Start DateTime + End DateTime (Composite)

Column 1: Total Good Biscuits Made

Data Type : Integer

Description : Number of good quality biscuits produced during the period

Example Values : 0 (for stoppages), 141, 453, 4414, 9554

Nullable : Yes

Primary Key : No

Business Rules : Will be 0 in case of complete stoppage (NO)

Column 2: Start DateTime

Data Type : DateTime (MM/DD/YYYY HH:MM)

Description : Date and time when production or stoppage period started

Example Values : 7/16/2021 2:08, 7/16/2021 14:02

Nullable : No

Primary Key : Yes (Part of composite key)

Business Rules : Must be before End DateTime

Column 3: End DateTime

Data Type : DateTime (MM/DD/YYYY HH:MM)

Description : Date and time when production or stoppage period ended

Example Values : 7/16/2021 2:28, 7/16/2021 14:21

Nullable : No

Primary Key : Yes (Part of composite key)

Business Rules : Must be after Start DateTime

Column 4: Stoppage Type

Data Type : Text (Categorical)

Description : Stoppage classification (Major or Minor)

Example Values : Major, Minor

Nullable : No

Primary Key : No

Business Rules : Major = Complete production stoppage

Minor = Slowdown or minor issue

Column 5: Total Units Made

Data Type : Integer

Description : Total number of units (cases/packs/pieces) produced

Example Values : 341823, 341768, 4414, 9554

Nullable : No

Primary Key : No

Business Rules : Varies according to machine measurement unit

Column 6: Good Made Units

Data Type : Integer

Description : Number of good quality units (no defects) from production

Example Values : 141, 453, 4414, 9554

Nullable : No

Primary Key : No

Business Rules : Must be <= Total Units Made

Used to calculate quality percentage

Column 7: OEE Code

Data Type : Text (2 Characters, Foreign Key)

Description : Code indicating stoppage reason or production state

Example Values : NO (No Order), RT (Run Time),

CC (Changeover Cleaning), PM (Maintenance)

Nullable : No

Primary Key : No

Foreign Key : References OEE Codes Table (OEE Code)

Business Rules : Must exist in OEE Codes table

GLOSSARY OF TERMS

==========

OEE : Overall Equipment Effectiveness - measure of manufacturing productivity combining availability, performance, and quality

Availability : Percentage of planned production time that operation is available

Performance : Speed at which work center runs as percentage of designed speed

Quality : Percentage of good units produced versus total units started

Downtime : Time when machine is not producing due to stoppage

Major Stoppage : Complete halt in production requiring intervention

Minor Stoppage : Brief interruption or slowdown in production

Changeover : Process of switching production from one product to another

Run Time : Period when machine is actively producing good products

No Order : Stoppage due to lack of production orders

Maintenance : Scheduled or unscheduled machine repair and servicing

Target Rate : Expected production output per time unit

Actual Rate : Real production output achieved per time unit

Good Units : Products meeting quality standards without defects

Reject Units : Products not meeting quality standards

Pack : Small consumer package containing biscuits

Case : Larger box containing multiple packs

Pallet : Platform holding multiple cases for storage/transport