

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD

TDMF

E

- | | | | |
|-----------|------------------------------------|-----------|-----------------------------------|
| 1 | TECHNICAL DATA MANAGEMENT FACILITY | 2.4.5 | Styling Object Change |
| 1.1 | TDMF OVERVIEW | 2.4.5.1 | Styling Stage |
| 1.2 | OBJECT CONCEPT | 2.4.5.1.1 | (R) Row Data |
| 1.3 | RELATIONSHIPS | 2.4.5.1.2 | (B) Bubble Up |
| 1.4 | RELEASE PROCEDURES | 2.4.5.1.3 | (P) Preliminary |
| 1.5 | SECURITY | 2.4.5.2 | Styling Release Level |
| 1.6 | ACCESS METHODS | 2.4.5.3 | Styling NMCI |
| 2 | OBJECT IDENTIFICATION | 2.4.5.4 | Styling PDI |
| 2.1 | OBJECT CLASSIFICATION | 2.4.5.5 | Styling Purpose |
| 2.1.1 | CRITIA | 2.4.6 | Technical File Objects |
| 2.1.2 | DOCMNT | 2.4.6.1 | Sequence Number |
| 2.1.3 | DWG | 2.4.6.2 | Version |
| 2.1.4 | DWGFMT | 2.5 | TECHNICAL FILE |
| 2.1.5 | EWO | 2.5.1 | Structures/Classifications |
| 2.1.6 | LYTFMT | 2.5.1.1 | CGM |
| 2.1.7 | MDATA | 2.5.1.2 | 2-D DWG Supt |
| 2.1.8 | MLASM | 2.5.1.3 | 2-D DWG 2-D Geometry |
| 2.1.9 | MLDES | 2.5.1.4 | 2-D DWG Supt/3-D Geometry |
| 2.1.10 | MLELEC | 2.5.1.5 | 2-D DWG Supt/3-D Part Geom. |
| 2.1.11 | MLREF | 2.5.1.6 | 2-D DWG 3-D Part Geometry |
| 2.1.12 | PART | 2.5.1.7 | 3-D DWG Geometry Pointer Files |
| 2.1.13 | PKG | 3 | RELATIONSHIPS |
| 2.1.14 | PLANAR | 3.1 | PRODUCT DESIGN TECH FILE OBJECTS |
| 2.1.15 | RAPPRO | 3.1.1 | Master Geometry |
| 2.1.16 | RDATA | 3.1.2 | Copied Geometry |
| 2.1.17 | STDPRT | 3.1.3 | Model Support |
| 2.1.18 | STUDY | 3.1.4 | Drawing |
| 2.1.19 | STYLNG | 3.1.5 | Drawing Support |
| 2.2 | OBJECT NUMBER | 3.2 | PRODUCT STYLING TECH FILE OBJECTS |
| 2.3 | SHEET/ITEM | 3.3 | ENGINEERING TECH FILE OBJECTS |
| 2.3.1 | Sheet | 3.3.1 | Part Support |
| 2.3.2 | Item | 3.4 | MANUF. TECHNICAL FILE OBJECTS |
| 2.4 | CHANGE MANAGEMENT | 3.4.1 | Related Product Objects |
| 2.4.1 | Change Management Rational | 3.5 | NO TECHNICAL FILE OBJECTS |
| 2.4.2 | EWO Object Change | 3.5.1 | Part Classified Objects |
| 2.4.3 | Part Object Change | 3.5.1.1 | Supersession |
| 2.4.3.1 | Part Stage | 3.5.1.2 | Up & Down Assemblies |
| 2.4.3.1.1 | (X) Experimental | 3.5.1.3 | Make From |
| 2.4.3.1.2 | (C) Clay Freeze | 3.5.1.4 | Color Parts |
| 2.4.3.1.3 | (U) Unnebbbed Surface | 3.5.2 | DWG Classified Objects |
| 2.4.3.1.4 | (D) Developmental | 3.5.2.1 | Supersession |
| 2.4.3.1.5 | (M) Manufacturing | 3.5.3 | EWO Classified Objects |
| 2.4.3.1.6 | (T) Tool Design | 3.5.3.1 | Authority |
| 2.4.3.1.7 | (P) Prototype | 4 | RELEASE PROCEDURES |
| 2.4.3.1.8 | (R) Production Release | 4.1 | STATUS |
| 2.4.3.1.9 | (O) Obsolete | 4.1.1 | Initialized |
| 2.4.3.2 | Release Level | 4.1.2 | Work In Process |
| 2.4.3.3 | NMCI | 4.1.3 | Pending |
| 2.4.3.4 | PDI | 4.1.4 | Approved |
| 2.4.3.5 | PLS | 4.1.5 | Inactive |
| 2.4.3.6 | DLS | | |
| 2.4.4 | DWG Object Change | | |
| 2.4.4.1 | Drawing Stage | | |
| 2.4.4.1.1 | (U) Unreleased | | |
| 2.4.4.1.2 | (R) Released | | |
| 2.4.4.2 | Release Level | | |
| 2.4.4.3 | PDI | | |

D2E00001(3/95)

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD TDMF

1 TECHNICAL DATA MANAGEMENT FACILITY (TDMF).

1.1 TDMF OVERVIEW. TDMF functions as the library for all engineering CAD data on a given network. Technical files constructed by various CAD applications can be deposited into TDMF. Once deposited, these files can be accessed or distributed to many different users.

1.2 OBJECT CONCEPT. Technical files that are deposited into TDMF are assigned administrative data or labels. These labels are referred to in generic terms as objects. They function similarly to file names but offer more in that the object can contain far more information than a file name can. Also, the object can control more than one technical file.

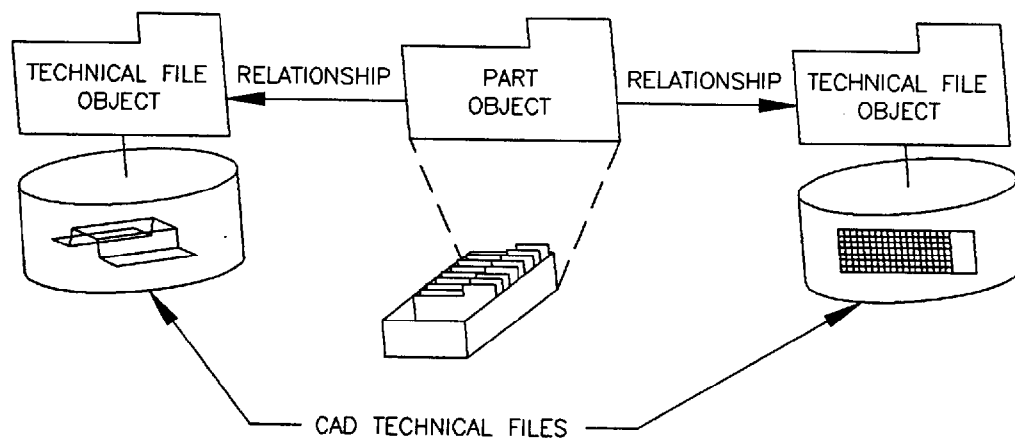
1.3 RELATIONSHIPS. Relationships connect objects together. They are built from one object to another. Relationships function as paths and are named in a manner that defines why two objects have been linked together (i.e., a master relationship is used to connect a technical file object containing the master part geometry of a part to the part object). Relationships define technical file contents in units of part and drawing.

1.4 RELEASE PROCEDURES. Objects in TDMF are controlled by release procedures which communicate the completeness of a specific object iteration. Each site can define the controlling release procedure for each object it creates. There are levels or status' in each release procedure that

objects progress through. Objects that have a release procedure status of APPROVED are complete for that specific iteration of the object. Work in progress status objects can be modified or deleted at the discretion of the creator. Access and functional control of the object can be varied depending upon the object's status.

1.5 SECURITY. Access to objects that are stored in TDMF is controlled on many levels. Database administrators define specific user's access to all objects. Access ranges from very broad (all objects) to very specific (a single object).

1.6 ACCESS METHODS. The controlled objects in TDMF may be accessed in a number of different manners. A common method of access requires a part or drawing number. Entering this number into TDMF will identify the latest release or active change of the part and/or drawing object. From either of these two objects additional information can be accessed. If older release levels of the part or drawing objects are desired all can be displayed. If the interest is in an associated technical file object, the relationships connected to the part or drawing object will guide the user to the appropriate file. Another common access method consists of using an alias feature. Objects can be assigned alternate identifications, alias', the structure and syntax of which are at the discretion of the TDMF site administration. Use of the alias will direct the user to appropriate part and/or drawing objects which again, will point to associated technical file objects. All objects can be accessed (proper security privileges are assumed) if the specific object identification is entered.



D2E00170(9/94)

FIGURE 1.7 - OBJECT, TECHNICAL FILE AND RELATIONSHIP CONCEPT DIAGRAM

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD TDMF

E

2 OBJECT IDENTIFICATION. The specific identification of a TDMF object requires a complete description of all object attributes.

2.1 OBJECT CLASSIFICATION. Each TDMF object requires a classification as part of its identification. The classification describes the general content of any technical file controlled by the object. Classifications are specific to file structure/CAD system combinations.

2.1.1 CRITIA (Criteria). The CRITIA classified objects control technical files that contain 3D geometries for parts that have not yet received GM part numbers. The files can also contain 3D nonpart geometry representing part/vehicle criteria information (e.g., door swing lines, H-Points). Displays of this information to support engineering drawings may be in these files. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.2 DOCMNT (Document). The DOCMNT classified objects control technical files that contain complete 2D drawings of textual nature or OS datasets containing such items as lists, letters, instructions, or design guides. This classification is intended for engineering drawings that require no formal engineering release. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.3 DWG (Drawing). The DWG classified objects control computer graphics metafile (CGM). It can also exist without a technical file. All supporting technical files are related to the DWG classified object through the object that labels them.

2.1.4 DWGFMT (Drawing Format). The DWGFMT classified objects control technical files that contain format and text necessary to construct a specific engineering drawing. No part geometry is allowed except for standard parts or fasteners. This classification is intended for engineering drawings that require a formal engineering release. It is intended that these objects be used for CGS and UG-V10 technical files.

2.1.5 EWO (Engineering Work Order). The EWO classified objects control no technical files. These objects document a valid PDS authority.

2.1.6 LYTFMT (Layout Format). The LYTFMT classified objects control technical files that contain format and text necessary to construct a specific engineering drawing. No part geometry is allowed except for standard parts or fasteners. This classification is intended for engineering drawings that require no formal engineering release. It is intended that these objects be used for CGS and UG-V10 technical files.

2.1.7 MDATA (Master Data). The MDATA classified objects control technical files that contain master 3D geometry. Copies of 3D part or nonpart geometry are also in these files. Complete 2D engineering drawings are contained in these files. It is intended that these objects be used for Cadam and Unigraphics technical files.

2.1.8 MLASM (Master Layout Assembly). The MLASM classified object controls technical files containing component entities and reference sets that access 3D master part geometry.

No part geometry is allowed in these files. This classification is for displays of assemblies that support multiple engineering drawings. It is intended that these objects be used for UGV10 technical files.

2.1.9 MLDES (Master Layout Design). The MLDES classified objects control technical files that contain master 3D part geometry and displays of this master geometry that support multiple engineering drawings. It is intended that these objects be used for CGS and UG-V10 technical files.

2.1.10 MLELEC (Master Layout Electrical). The MLELEC classified objects control technical files that contain 3D part geometry and requirement data for wiring harnesses. This can include multiple parts. Displays of the geometry to support engineering drawings are also in this file. Copies of electrical connectors are allowed. This information is to be treated as a standard part. It is intended that these objects be used for CGS and UG-V10 technical files.

2.1.11 MLREF (Master Layout Reference). The MLREF classified objects control technical files that contain reference copies of 3D part geometry for parts whose master geometry files reside in some other TDMF organization, in another CAD system or as a manual drawing. Displays of the geometry to support multiple engineering drawings are also in the file. It is intended that these objects be used for CGS and UG-V10 technical files.

2.1.12 PART. The PART classified objects control no technical files directly. Technical files containing part information, geometry, tooling...etc., are related to the part classified object through the object that labels them.

2.1.13 PKG (Package). The PKG classified objects control technical files that contain copies of 3D part geometry. The master geometry resides within the same TDMF organization. The geometry is intended for completed assemblies or envelope data. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.14 PLANAR. The PLANAR classified objects control technical files that contain combinations of 2D part geometry and/or a complete 2D engineering drawing. This classification is intended for engineering drawings that require a formal engineering release. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.15 RAPPRO (Rapid Prototype). The RAPPRO classified objects control technical files that contain 3D part geometry intended for rapid prototype builds (e.g., stereolithography). It is intended that these objects be used for Cadam, CGS and UG technical files.

2.1.16 RDATA (Reference Data). The RDATA classified objects control technical files that contain reference copies of 3D geometry for parts whose master geometry files reside in some other TDMF organization, in another CAD system or as a manual drawing. Complete 2D engineering drawings can be contained in these files. It is intended that these objects be used for Cadam and Unigraphics technical files.

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD TDMF

E

2.1.17 STDPRT (Standard Part). The STDPRT classified objects control technical files that contain the 3D geometry for a GM standard part. A complete 2D engineering drawing is in this file. The standard part geometry is not displayed to support other engineering drawings but rather, is copied from this master file and stored in other files for each specific use. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.18 STUDY. The STUDY classified objects control technical files that contain 3D geometries for parts that may or may not have received GM part number identification. An engineering drawing (identified with an experimental part number) may be in this file. This classification is intended for engineering drawings that require no formal engineering release. It is intended that these objects be used for Cadam, CGS and Unigraphics technical files.

2.1.19 STYLNG (Styling). The STYLNG classified objects control technical files that contain product styling information. This consists of 3D nonpart specific geometry. An engineering drawing may also be in this file. The master styling files are stored in NAO Design Center's TDMF database. Any STYLNG file stored in another TDMF database is an exact copy of the original.

2.2 OBJECT NUMBER. Each TDMF object requires an object number as part of its identification. The origins and format of the number is dependent upon the selected object classification. For most product classifications the object number consists of the GM part number or drawing number as obtained from the Product Description System (PDS).

2.3 SHEET/ITEM. The sheet or item identifier is used to further delineate the use of a single object number when it must be broken down into components.

2.3.1 Sheet. The sheet identifier of an object is a 3 position numeric field. It is right justified with leading zero's (e.g., 001). The purpose of the sheet identifier is to track multiple sheets of a drawing when multiple drawing formats (border packages) are used based upon the same drawing number. All TDMF objects that derive their object number from the GM drawing number may also have a sheet identifier.

2.3.2 Item. The item identifier of an object is a 2 character alphabetic field. The purpose of the item identifier is to track multiple components of a purchased assembly when the parts do not have GM part numbers. When parts are identified by a GM part number, the item identifier is blank. All TDMF objects that derive their object number from the GM part number must also have an item identifier.

FIGURE 2.2

Classification	Object #	Format	Origin
CRITIA	12345678	8-Digit Dwg #	PDS
DOCMNT	ABCDEFGHJ	15-Digit Alpha Nu	User
DWG	12345678	8-Digit Dwg #	PDS
DWGFMT	12345678	8-Digit Dwg #	PDS
EWO	G1234A	8-Digit EWO #	PDS
LYTFMT	6L123456	6-Digit Dwg #	PDS
MDATA	12345678	8-Digit Dwg #	PDS
MLASM	12345678	8-Digit Part #	PDS
MLDES	12345678	8-Digit Part #	PDS
MLELEC	12345678	8-Digit Dwg #	PDS
MLREF	12345678	8-Digit Part #	PDS
PART	12345678	8-Digit Part #	PDS
PKG	12345678	8-Digit Part #	PDS
PLANAR	12345678	8-Digit Dwg #	PDS
RAPPRO	12345678	8-Digit Dwg #	PDS
RDATA	12345678	8-Digit Dwg #	PDS
STDPRT	12345678	8-Digit Dwg #	PDS
STUDY	6X123456	8-Digit Dwg #	PDS
STYLNG	123456	6-Digit Dwg #	Rel-trak

2.4 CHANGE MANAGEMENT. The management of change in TDMF requires an understanding of the TDMF components that require change tracking (i.e., EWO objects, PART objects, DWG objects and technical file objects).

2.4.1 Change Management Rationale. The part object in TDMF is the center hub for a network of information about a specific part at a specific change iteration. Some of the information that defines a part is stored in TDMF (i.e., math model, releasing drawing, ...). This information is stored in technical data files developed on various CAD and CAE tools.

Often an attempt is made to link these many technical files to a single part at a single change iteration by naming the technical files with the part number and change identifier. This method works when information for a single part is contained in a single technical file. Whenever there is information for more than one part in a single technical file this method fails. Technical files can only have one name. Only one of the parts can be identified.

A further consideration is that changes occur to technical files that do not affect the part information that is contained within them (i.e., data structure corrections). To return altered technical files to the protected TDMF database the object that controls the technical file must increase in change level. This increase in change identifier is misleading, the part did not change, the technical file did.