Content Developers Kit

Preventative Maintenance Scheduled Service Time (PMSST) w/ Estimating OE Parts

Vehicle Key – ACES

V1.2

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1 Overview

MOTOR has developed a database that combines the industry-standard "Chek-Chart" Preventive Maintenance database with the equally-popular automotive dealership standard "MOTOR OE Parts & Labor" database. The resultant combination will be unlike anything presently on the market. This database is integrated with the recommended scheduled services for each vehicle to the required OE Parts and labor times associated with each procedure.

The **SST** dataset is created by taking each OE-recommended scheduled service procedure, both normal and severe, and associating each with a labor time that has been calculated on a "per minute" basis. Typically each OE labor time is in tenth of an hour increments, however in the convenient services/fast oil change market, time is absolutely critical, so frequently the whole service experience might be targeted at ten or fifteen minutes. Obviously for this environment, a labor time that is only accurate to tenths of an hour is not an acceptable solution. MOTOR has instead segmented each into minutes.

The real beauty of the product however, is that it will allow you to "build-on-the-fly" the specific maintenance cost for each action/item/part/labor combination. So, for example, if a customer has a vehicle that has 78,000 miles on it, the **SST** database will allow you to calculate the costs not only for the 75k mile interval that the vehicle just passed, but also items that may not have been completed at prior recommended service intervals. With the aforementioned example, perhaps at 78,000 miles the vehicle did not have the timing belt replaced at 60,000 miles. Now with the new database you can calculate the accurate cost at 78,000 miles including what was missed at the 60k interval.

The data files described in this document comprise the MOTOR Chek-Chart ScheduledServiceTime Delivery database. This database covers OEM scheduled preventive maintenance recommendations and MOTOR Estimated Work Time (EWT) labor allowances for most domestic and imported car and light truck models available in the U.S. from 1985 through the current model year. Low census (low sales volume and exotic) vehicles may be excluded.

Vehicle specific data records in this database are associated to the Automotive Aftermarket Industry Association (AAIA) ACES Vehicle Application Key (VCdb). Replacement parts are listed with the AAIA PCdb Part Terminology ID. Additional, representative OE Part Numbers with pricing are provided for replacement parts where available. Monthly updates for the Part Prices are provided. For more information on the AAIA ACES Standard, please see http://www.autocare.org/what-we-do/technology/technologyhelp/.

The following special conventions are used in the SST database:

1. The MOTOR Operation Taxonomy presents the MOTOR standard naming convention for operation names in a hierarchical structure. Each LiteralName_English value represents a unique conceptual operation.
2. A zero value in the Estimated Work Time value field indicates a time for that specific operation has not been developed by MOTOR. In these instances the end user must supply a time.

2 Glossary

Estimated Work Time (EWT): The estimated time in minutes to perform an Operation under normal circumstances.

Included Operations: Included Operations are operations that are performed in the course of completing the main operation.

MOTOR Operations: MOTOR's standardized Operation naming convention. These operation names are organized into a taxonomy classification by vehicle systems and assemblies.

MOTOR Qualifier: MOTOR Qualifiers are notes attached to operations that are used to distinguish between two or more applications that apply to the same vehicle, operation name, and operation position. MOTOR Qualifiers are standardized and organized into a three tier categorization.

Operation Footnote: Footnotes are notes attached to an operation that communicate important information to the end user about the specific application such as operations that are included in the EWT, operations that are not included, and other important information that relates specifically to the EWT. Footnotes are not used to distinguish between two or more applications.

Part Price: MSRP for a given OE Part Number as of the time the data was extracted (usually within one week before delivery). Part pricing is delivered in spate csv files; one for each manufacturer.

Replacement Part: A part that is likely required to be replaced while performing an operation. In this dataset, the element <ReplacementPart> contains an attribute of ServiceType. Only records where ServiceType = 2 indicate an actual part that needs to be replaced.

Service Type: The Service Type defines the relationship between the Operation in context to a part name specified in the ReplacementPart element. This attribute will indicate whether or not a part is required to be replaced as part of the Operation and if it should be included as part of the estimate. Part Types that are not required for replacement are included to help integrate with other MOTOR products such as Quick Lube.

3 Business Rules

1) **Business Rule: (MOTOR_SST_wPart.XML)** Each App record will contain 0 or one of each VCdb vehicle attribute type. If, for example, a vehicle has three sub models available and a labor time applies to two of the sub models' that labor time will be repeated in two different app records, one for each sub model.

2) **Business Rule: (MOTOR_SST_WPARTS.XML)** MOTOR Operations to PCdb parts relationships will be created and maintained on a global level and exploded to each app record. Operation to parts relationships can be adjusted at the app record level only in response to user feedback and on a case by case basis.

3) **Business Rule: (MOTOR_SST_wParts.XML)** The standard for the global Operations to ReplacementParts mapping is that each MOTOR Operation is mapped to the parts that are required to be replaced each time the given operation is performed for most vehicles. These are essentially the parts required for an upfront estimate. The technician may find that additional parts require replacement once performing the operation.

4) **Business Rule: (MOTOR_SST_wParts.XML)** If more than one note (MOTOR Qualifier) record is present within an app record, then each of the notes must be true for the record to be considered a valid application. The same is true of IncludedOperation records that include more than one IncludedOperation_Note.

   NOTE: Many GUI applications may benefit from the approach that multiple note records be concatenated into single strings for the end user to select.

5) **Business Rule: (MOTOR_Qualifier.xml)** Each Qualifier description will be unique.

6) **Business Rule: (MOTOR_Qualifier.xml)** If an end user indicates that a Qualifier record with a QualifierType of "Vehicle Attribute" is applicable to the vehicle in context, then any data related to a Qualifier record with the same QualifierType and Qualifier Value values as the selected Qualifier can be declared not applicable for the vehicle in context. For example, if the Qualifier "With Air Conditioning" is selected, any labor attached to the Qualifier "Without Air Conditioning" can be eliminated from consideration for the end user as both Qualifiers are of the Qualifier Vehicle Type and share the same Qualifier Family value.

7) **Business Rule: (MOTOR_OperationTaxonomy.xml)** Each LiteralName value is unique and can be used to represent the entirety of the given taxonomy path.

8) **Business Rule: (MOTOR_SST_wParts.XML)** Each app record and each IncludedOperation will have position values. If the position is not relevant in the given operation, the position value of "N/A" will be used.

9) **Business Rule:** <Note> elements with an attribute value of vehicleattribute="yes" pertain to the whole <app> element, including all Included Operations within the app. These are qualifiers that help to describe the vehicle.

10) **Business Rule:** <Note> elements with an attribute value of vehicleattribute="no" only pertain to the main MOTOR Operation record in the app, not the Included Operations within the app.

11) **Business Rule:** When creating an EWT estimate, a combination of MOTOR_OperationTaxonomy, set of concatenated Qualifiers, and VCdb Attributes associated to a MOTOR_Operation record, Position, and Severe Service should only be included once at most.

12) **Business Rule: (MOTOR_OperationTaxonomy.xml)** While the textual value of a LiteralName associated with an ID may change over time to account for spelling corrections, grammatical changes, and naming standardization, the conceptual meaning of the Operation Taxonomy tied to an ID will not change.

13) **Business Rule: (MOTOR_Qualifier.xml)** While the textual value of a QualifierDescription associated with an ID may change over time to account for spelling corrections, grammatical changes, naming standardization, the conceptual meaning of the MOTOR Qualifier tied to an ID will not change. However, the Qualifier classification (QualifierType and QualifierFamily) may change for a Qualifier ID.

14) **Business Rule: (MOTOR_SST_wParts.XML)** If a SST_Interval has multiple recommendation values, such as Millage and Months, the recommendation is whichever becomes true first.

15) **Business Rule: (MOTOR_Frequency.xml)** MOTOR Frequency data is static. Any required changes would be communicated prior to being implemented.

16) **Business Rule: (MOTOR_ Lubricant.xml)** Existing MOTOR Lubricant records will not change except as needed for spelling, grammatical or similar needs. New records may be introduced with regular deliveries.

17) **Business Rule: (MOTOR_SevereService.xml)** MOTOR Severe Service data is static. Any required changes would be communicated prior to being implemented.

18) **Business Rule: (MOTOR_Warranty.xml)** Existing MOTOR Warranty records will not change except as needed for spelling, grammatical or similar needs. New records may be introduced with regular deliveries.

19) **Business Rule: (MOTOR_ServiceType.xml)** Existing MOTOR Service Type records should not change except as needed for spelling, grammatical or similar needs. Any substantive changes to existing records or the addition of new records will be communicated prior to being implemented.

20) **Business Rule: (MOTOR_SST_Note.xml)** Existing MOTOR SST Note records may change their description value. While most changes to existing records will be for spelling and grammatical changes, it is possible that substantive changes are made to existing SST Notes with the regular deliveries. Additional SST Note values are often likely to be created as well.

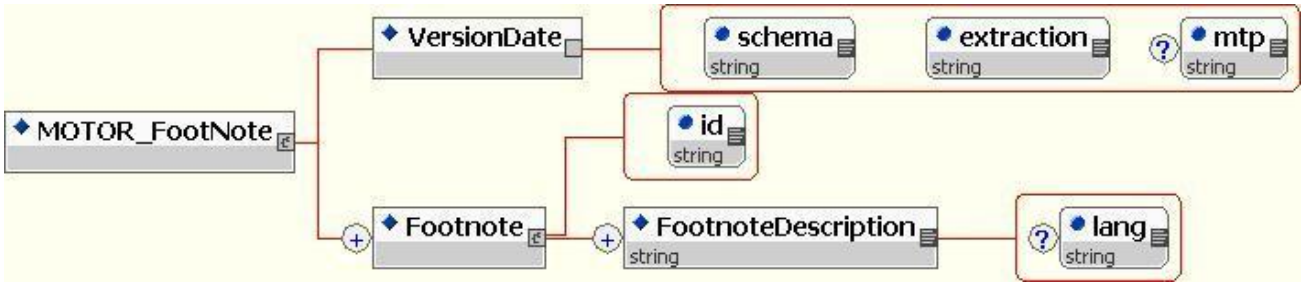
21) **Business Rule:** Unless specified otherwise in the Operation Footnote, the EWT attached to each MOTOR_Operation instance includes action to all instances of the implied component that relate to the combination of MOTOR_Taxonomy, Position, and Qualifier in context. For example, if the Operation is Accessory Drive Belt Inspect, the position is N/A, and there are no Qualifiers attached, the EWT is the time required to inspect all of the Accessory Drive Belts on the vehicle.

4 Schema

4.1 MOTOR Footnote

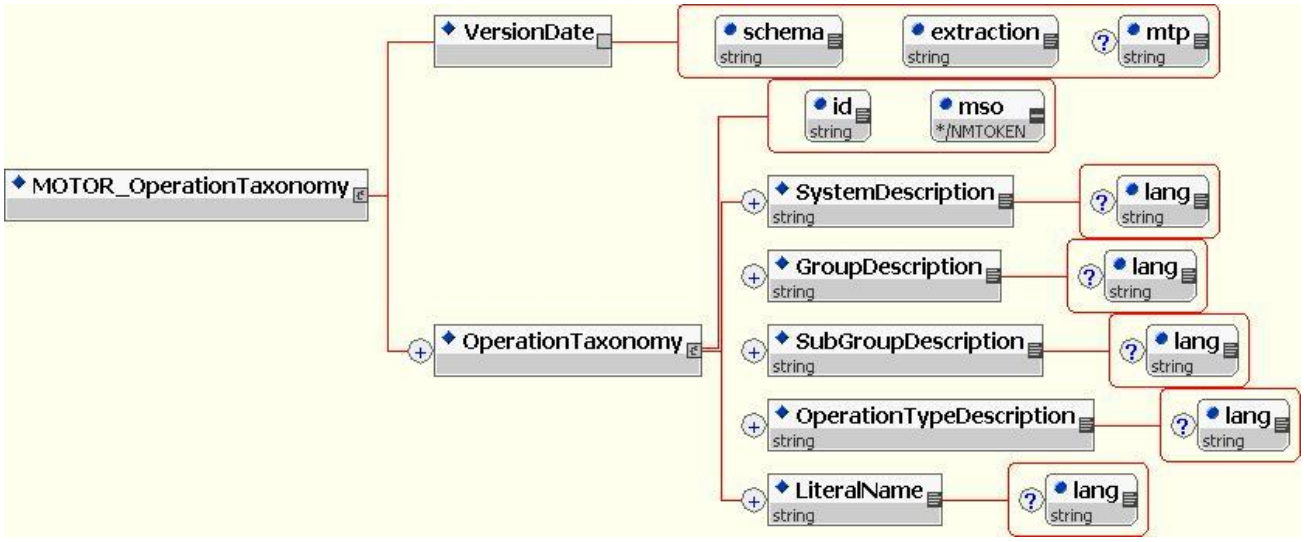
Schema filename: MOTOR_Footnote.xsd

Note: This table will rarely be used with the PMSST product. As of 3/1/2010, there is not any Footnote data coded and this table is not being delivered.



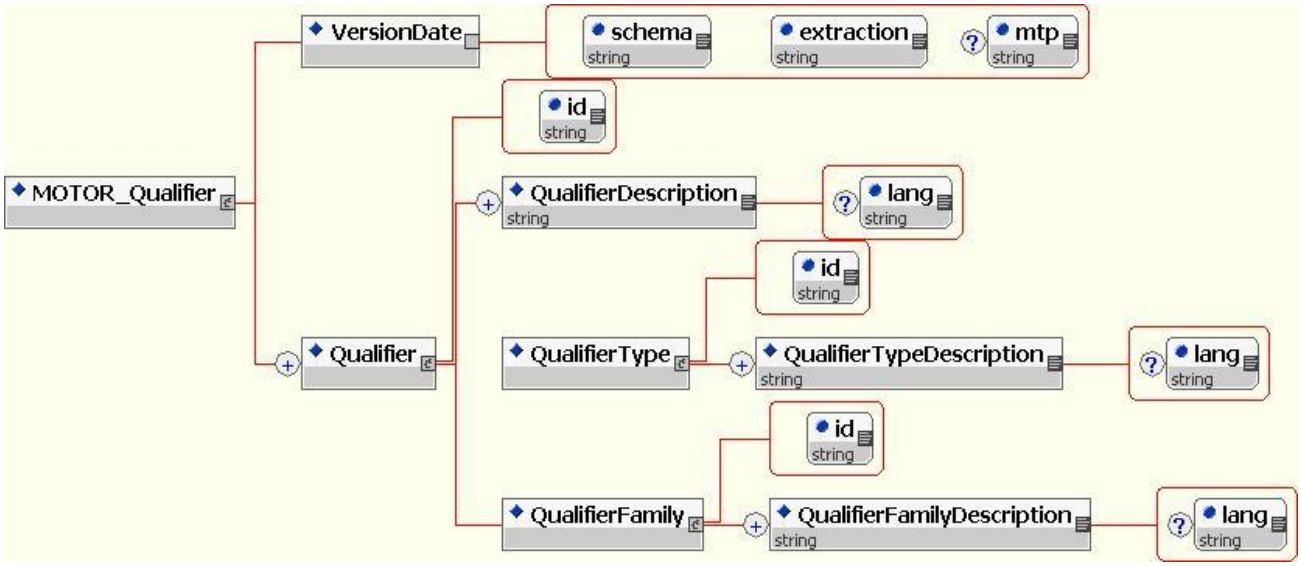
4.2 MOTOR Operation Taxonomy

Schema filename: MOTOR_OperationTaxonomy.xsd



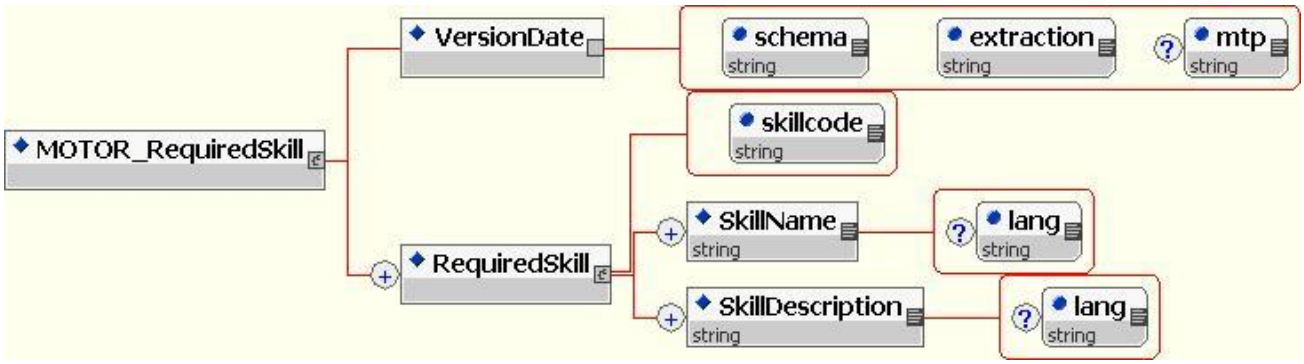
4.3 MOTOR Qualifier

Schema filename: MOTOR_Qualifier.xsd



4.4 MOTOR Required Skill

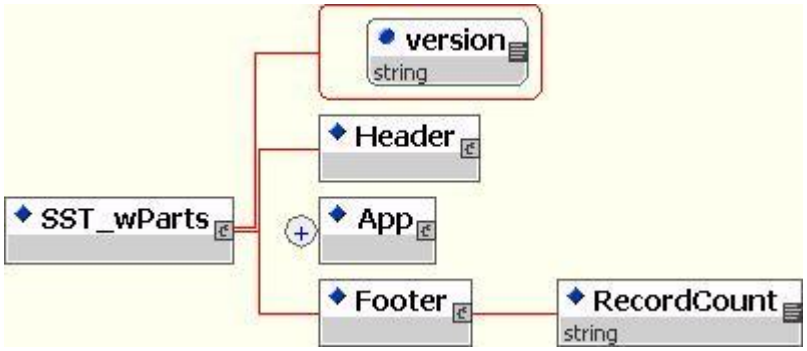
Schema filename: MOTOR_RequiredSkill.xsd



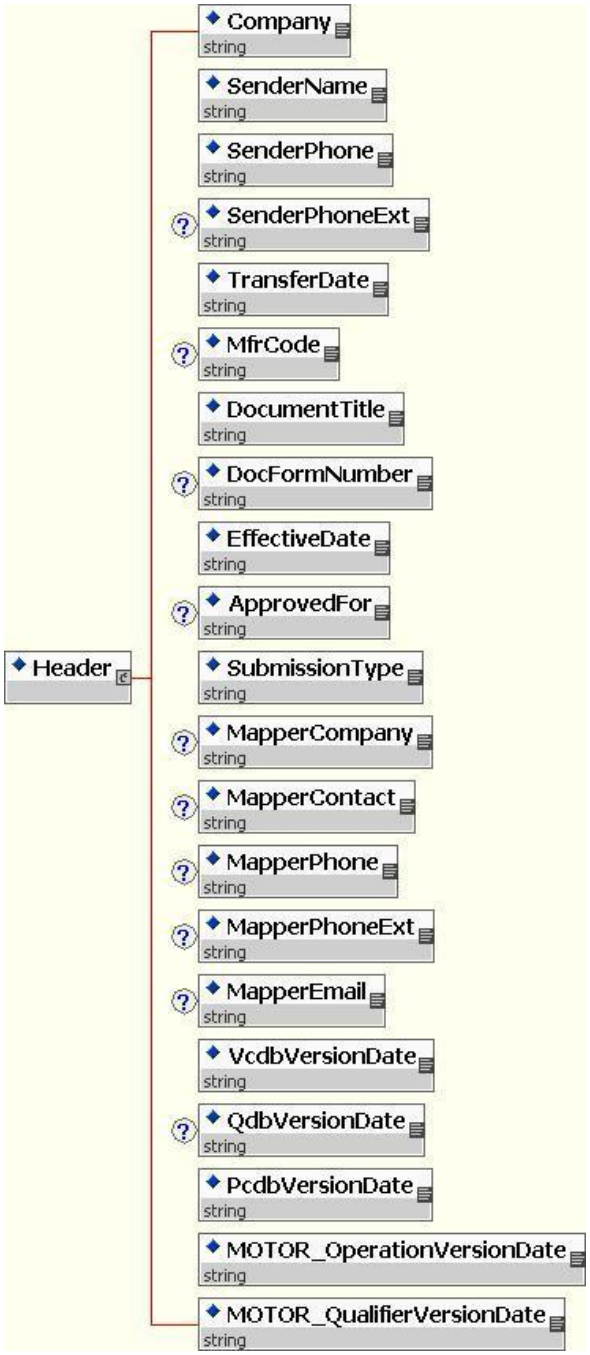
4.5 MOTOR_SST_wParts

Schema filename: MOTOR_SST_wParts.xsd

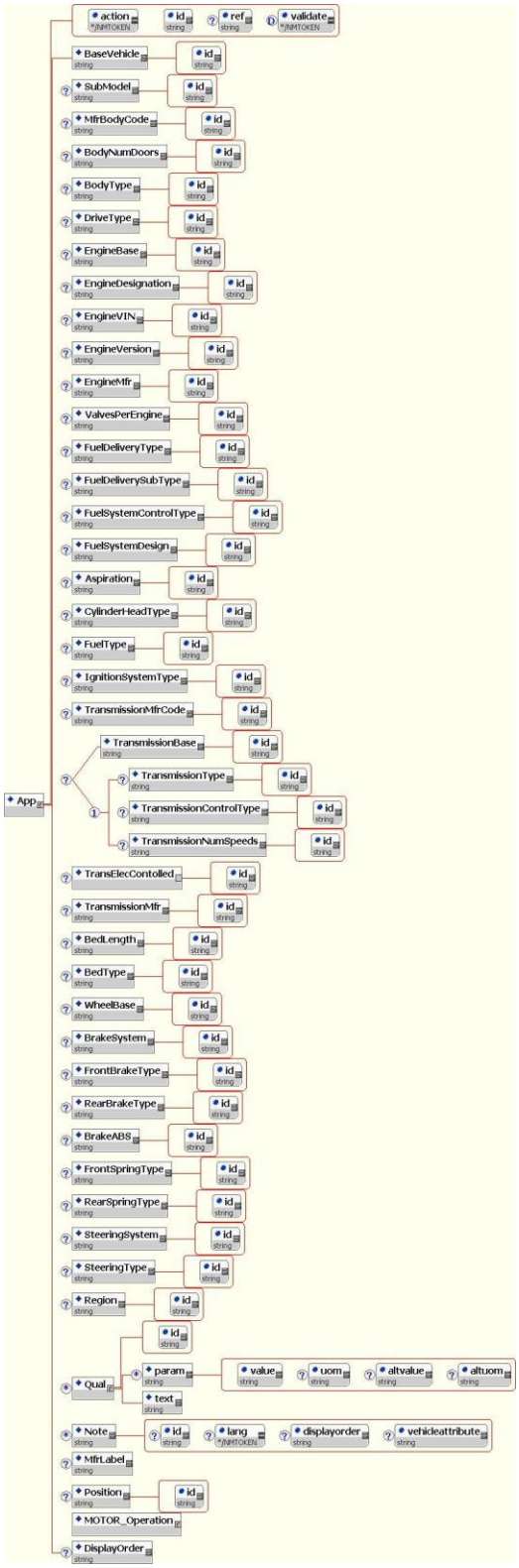
4.5.1 Shell



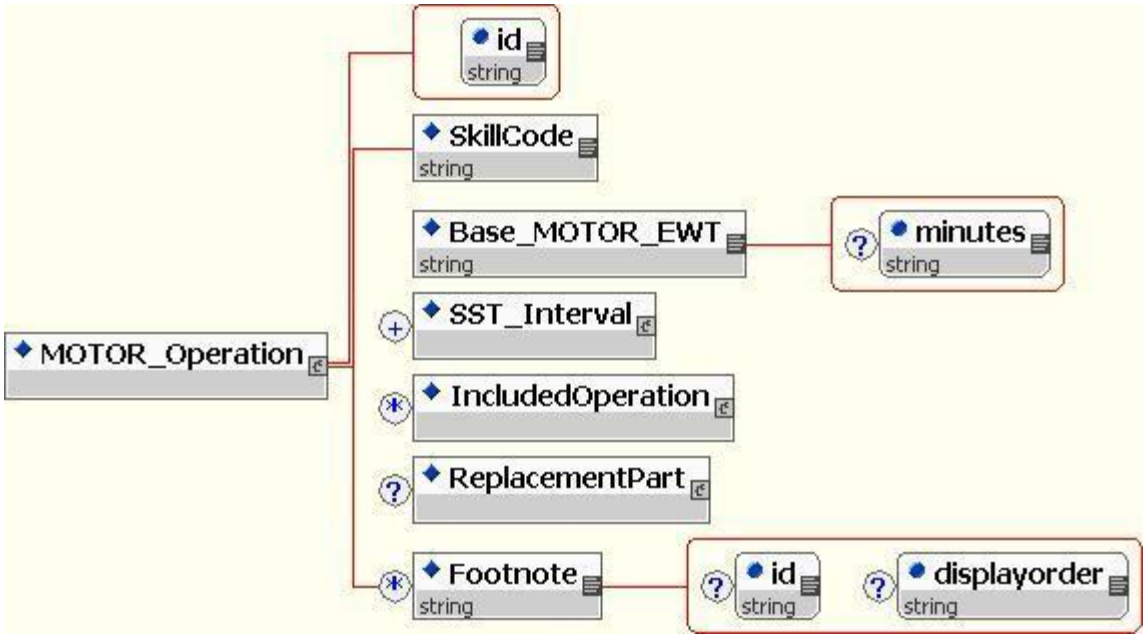
4.5.2 Header



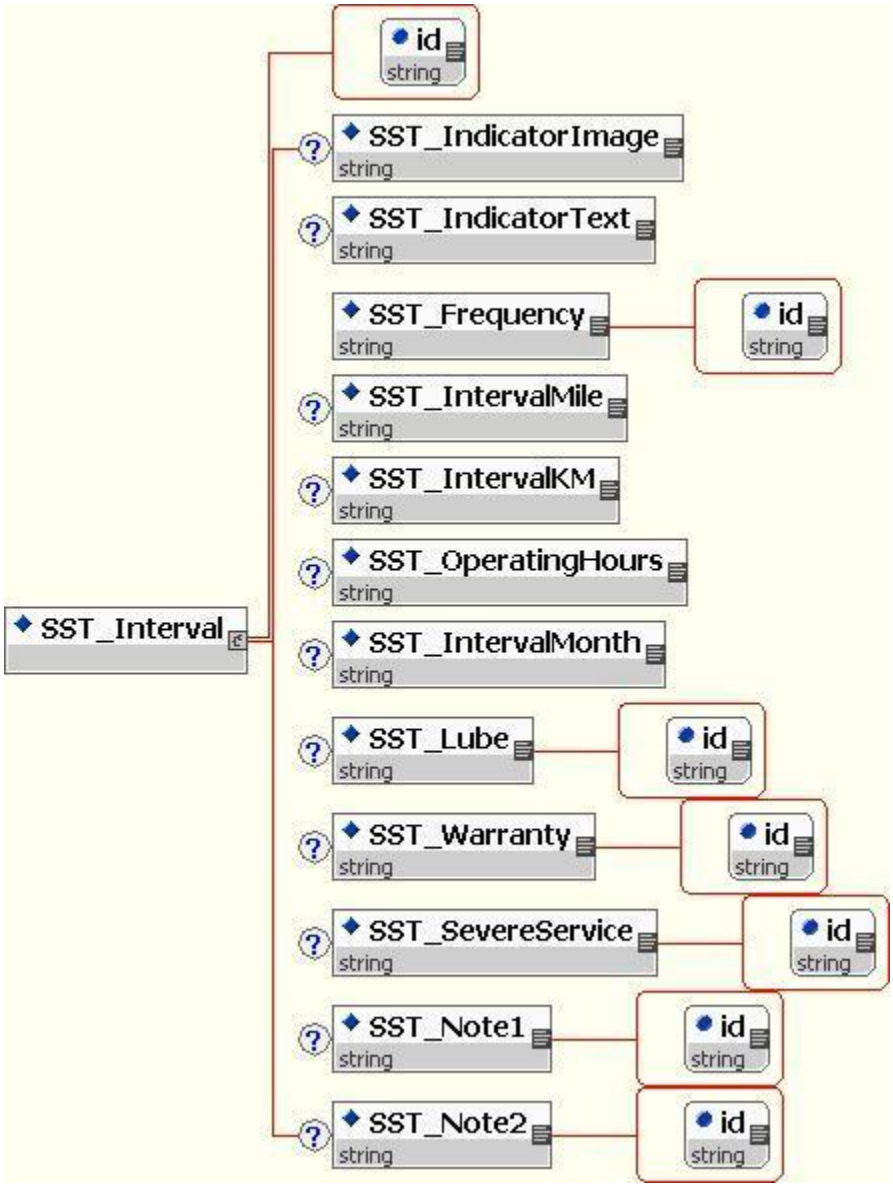
4.5.3 App



4.5.4 MOTOR_Operation

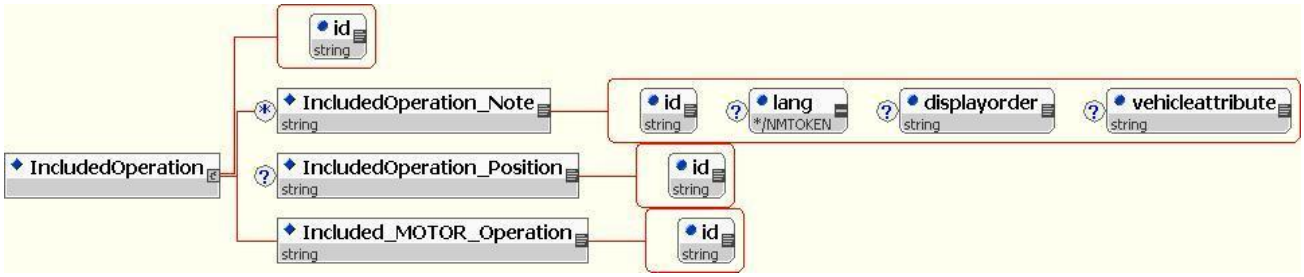


4.5.5 SST_Interval

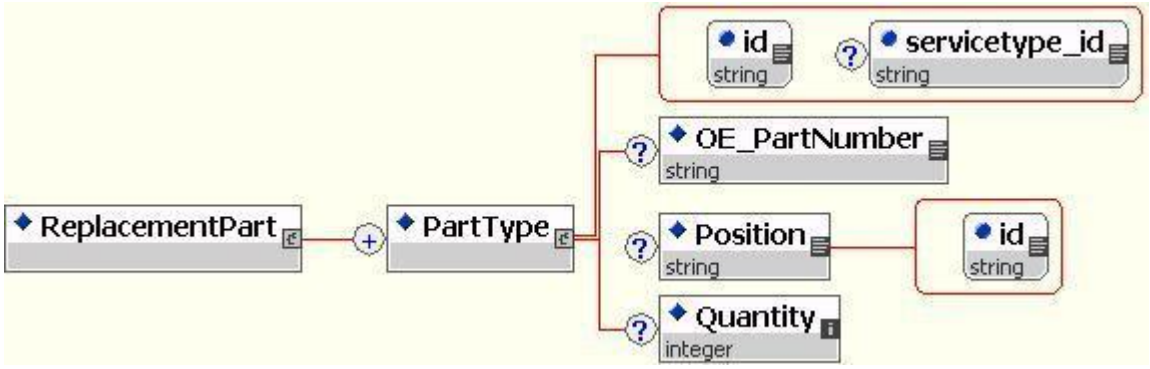


4.5.6 IncludedOperation

Note: Included Operations will rarely be used with the PMSST product. As of 3/1/2010, there is not any IncludedOperation data coded to the service schedules.



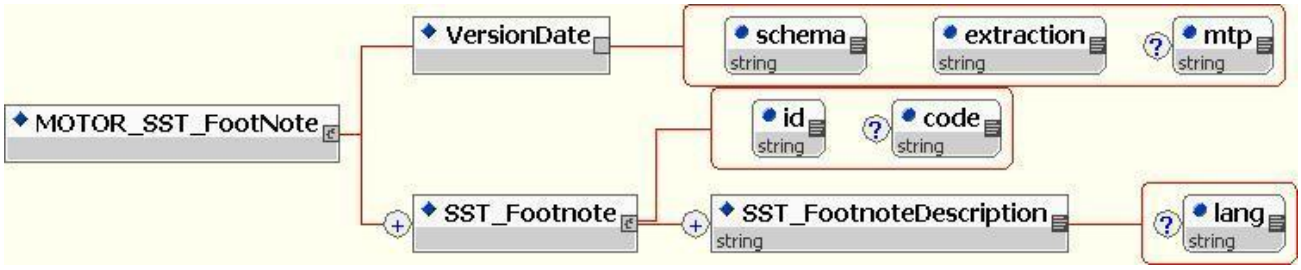
4.5.7 ReplacementPart



4.6 MOTOR SST Note

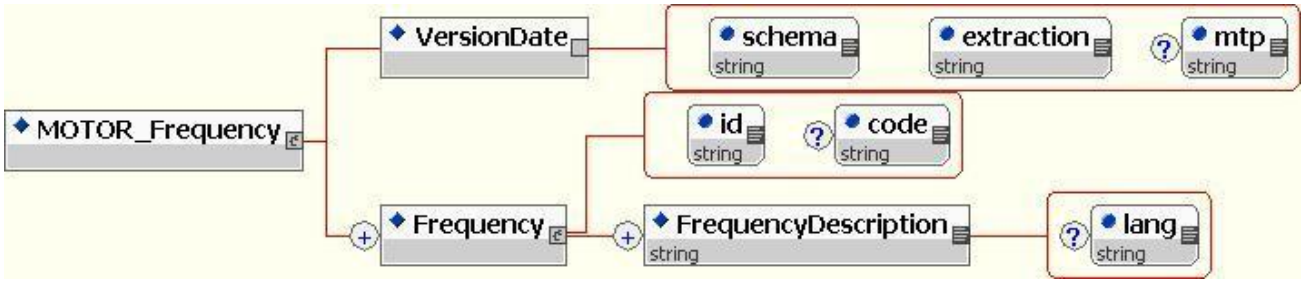
Schema filename: MOTOR_SST_Note.xsd

Please note that MOTOR_SST_Footnote will be changed to MOTOR_SST_Note with the first full production delivery. The updated CDK will reflect these changes.



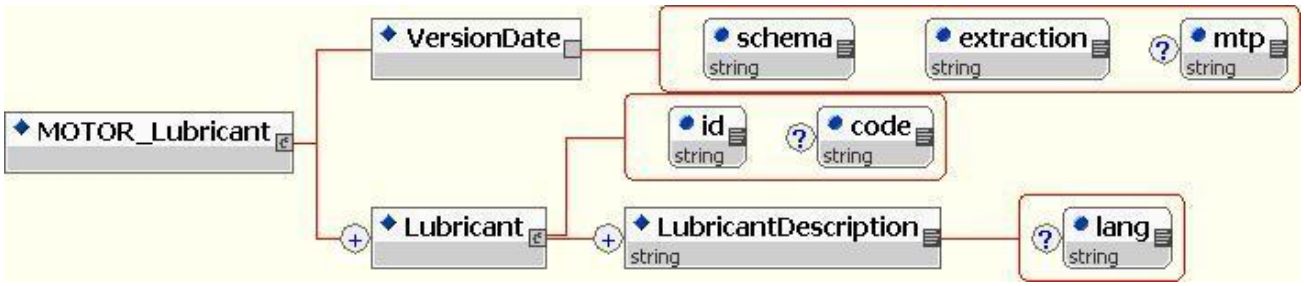
4.7 MOTOR Frequency

Schema filename: MOTOR_Frequency.xsd



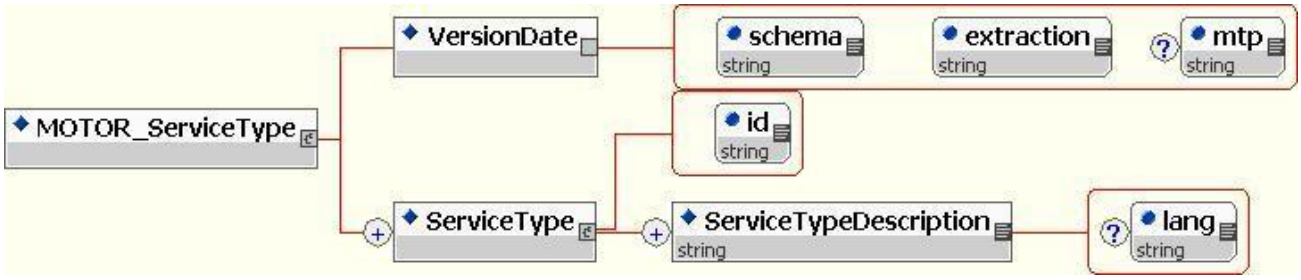
4.8 MOTOR Lubricant

Schema filename: MOTOR_Lubricant.xsd



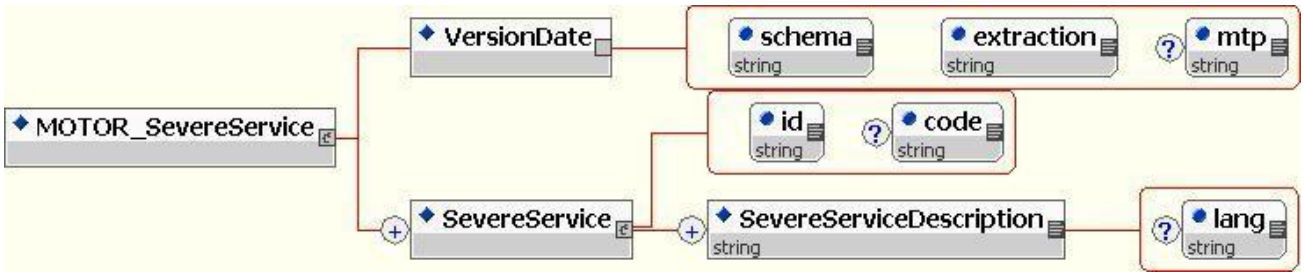
4.9 MOTOR Service Type

Schema filename: MOTOR_ServiceType.xsd



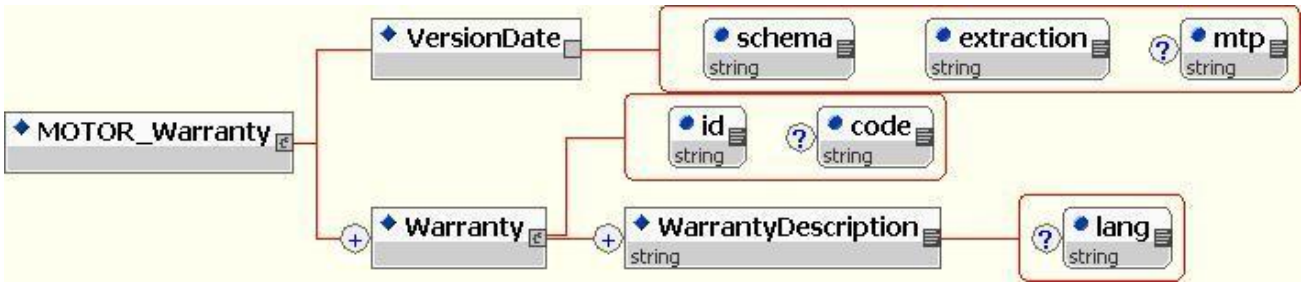
4.10 MOTOR Severe Service

Schema filename: MOTOR_SevereService.xsd



4.11 MOTOR Warranty

Schema filename: MOTOR_Warranty.xsd



5 Data Dictionary

5.1 XML File: Footnote.xml

MOTOR Footnote description definitions. Footnotes describe operations that are included or important operations that are not included. They may also contain important descriptive information.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_FootNote	Elements	(VersionDate , Footnote+)		Yes		MOTOR Footnote root element
2	VersionDate	EMPTY		schema	Yes	Yes	Atttibute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	Footnote	Elements	(FootnoteDescription+)	id	Yes	Yes	The attribute "**id**" is unique, this id is referenced in **MOTOR_SST_wParts.XML** as
4	FootnoteDescription	Elements	string	lang	Yes	No	MOTOR footnote description. The attribute "lang" indicates the language for the description, default language is English. Descriptions can be multiple, each with

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
							different "**lang**" attribute

5.2 XML File: MOTOR_OperationTaxonomy.xml

Standard MOTOR Operation taxonomy definitions

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_OperationTaxonomy	Elements	(VersionDate , OperationTaxonomy+)		Yes		MOTOR Master Operation Taxonomy root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	OperationTaxonomy	Elements	(SystemDescription , GroupDescription , SubGroupDescription , OperationTypeDescription , LiteralName)	id	Yes	Yes	The attribute "**id**" is unique and represents MOTOR Operation taxonomy path description, this id is referenced in MOTOR_SST_wParts.XML as MOTOR_Operation id
				mso			Yes/No flag to indicate if this taxonomy is MOTOR Standard Operation. This information is used

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
							mainly for internal QC purposes.
4	SystemDescription	Type	String	lang	Yes	No	MOTOR Standard System description The attribute “lang” indicates the language for the description, default language is English. Descriptions can be multiple, each with different “**lang**” attribute
5	GroupDescription	Type	String	lang	Yes	No	MOTOR Standard Group description The attribute “lang” indicates the language for the description, default language is English. Descriptions can be multiple, each with different “**lang**” attribute
6	SubGroupDescription	Type	String	lang	Yes	No	MOTOR Standard SubGroup description The attribute “lang” indicates the language for the description, default language is English. Descriptions can be multiple, each with different “**lang**” attribute
7	OperationTypeDescription	Type	String	Lang	Yes	No	MOTOR Standard Operation type description The attribute “lang” indicates the language for the description, default language is English. Descriptions can be multiple, each with different “**lang**” attribute

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
8	LiteralName	Type	String	lang	Yes	No	MOTOR Standard Operation description The attribute “lang” indicates the language for the description, default language is English. Descriptions can be multiple, each with different “**lang**” attribute

5.3 XML File: MOTOR_Frequency.xml

Scheduled service frequency descriptions.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_Frequency	Elements	(VersionDate , Frequency +)		Yes		MOTOR PMSST Frequency root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute “**schema**” indicates the schema version date (see date format note below)
				extraction		Yes	Attribute “**extraction**” indicates the extraction date (see date format note below)
				mtp		No	Attribute “**mtp**” indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	Frequency	Elements	(FrequencyDescription)	id	Yes	Yes	The attribute “**id**” is unique and represents MOTOR Frequency, this id is referenced in MOTOR_SST_wParts.X

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
							ML as MOTOR_Frequency id
				Code		Yes	Legacy PM Frequency Code value.
4	FrequencyDescription	Type	String		Yes		MOTOR Frequency description

5.4 XML File: MOTOR_Lubricant.xml

Scheduled service Lubricant descriptions.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_ Lubricant	Elements	(VersionDate , Lubricant +)		Yes		MOTOR PMSST Lubricant root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	Lubricant	Elements	(LubricantDescription)	id	Yes	Yes	The attribute "**id**" is unique and represents MOTOR Lubricant, this id is referenced in MOTOR_SST_wParts.XML as MOTOR_ Lubricant id

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
				Code		Yes	Legacy PM Lubricant Code value.
4	LubricantDescription	Type	String		Yes		MOTOR Lubricant description

5.5 XML File: MOTOR_ SevereService.xml

Scheduled service SevereService descriptions.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_ SevereService	Elements	(VersionDate , SevereService +)		Yes		MOTOR PMSST SevereService root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	SevereService	Elements	(SevereServiceDescription)	id	Yes	Yes	The attribute "**id**" is unique and represents MOTOR SevereService, this id is referenced in MOTOR_SST_wParts.XML as MOTOR_ SevereService id
				Code		Yes	Legacy PM SevereService Code

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
							value.
4	SevereServiceDescription	Type	String		Yes		MOTOR SevereService description

5.6 XML File: MOTOR_ Warranty.xml

Scheduled service Warranty descriptions.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_ Warranty	Elements	(VersionDate , Warranty+)		Yes		MOTOR PMSST Warranty root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	Warranty	Elements	(WarrantyDescription)	id	Yes	Yes	The attribute "**id**" is unique and represents MOTOR Warranty, this id is referenced in MOTOR_SST_wParts.XML as MOTOR_ Warranty id
				Code		Yes	Legacy PM Warranty Code value.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
4	WarrantyDescription	Type	String		Yes		MOTOR Warranty description

5.7 XML File: MOTOR_ ServiceType.xml

Service Type descriptions for Replacement Parts. Service Type indicates rather or not the replacement part is required to be replaced for a specific Operation.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_ ServiceType	Elements	(VersionDate , ServiceType+)		Yes		MOTOR ServiceType root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	ServiceType	Elements	(ServiceTypeDescription)	id	Yes	Yes	The attribute "**id**" is unique and represents MOTOR ServiceType, this id is referenced in MOTOR_SST_wParts.XML in the ReplacmentPart element as servicetype_ID
4	ServiceTypeDescription	Type	String		Yes		MOTOR Warranty description

5.8 XML File: MOTOR_Qualifier.xml

MOTOR Qualifier description definition. When there is more than one MOTOR EWT for the same MOTOR operation description on base vehicle with vehicle attributes, the operation will be qualified with appropriate description, which is not covered by VCDB attributes. For example: With Air condition and Without Air condition.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_Qualifier	Elements	(VersionDate , Qualifier+)		Yes		MOTOR Qualifier root element
2	VersionDate	EMPTY		schema	Yes	Yes	Atttibute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	Qualifier	Elements	(QualifierDescription+, QualifierType, QualifierFamily)	id	Yes	Yes	Attribute "**id**" is unique for each MOTOR qualifier description. This **id** is referenced in MOTOR_SST_wParts.XML as Note
4	QualifierDescription	Elements	string	lang	Yes	No	MOTOR Qualifier description. The attribute "lang" indicates the language for the description; default language is English. Descriptions can be multiple, each with a different "**lang**" attribute
5	QualifierType	Elements	(QualifierTypeDescription+)	id	Yes	Yes	MOTOR Qualifier type

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
6	QualifierTypeDescription	Elements	string	lang	Yes	No	MOTOR Qualifier type description. The attribute "**lang"** indicates the language for the description; default language is English. Descriptions can be multiple, each with a different "**lang**" attribute
7	QualifierFamily	Elements	(QualifierFamilyDescription+)	id	Yes	Yes	MOTOR Qualifier Family
8	QualifierFamilyDescription	Elements	string	lang	Yes	No	MOTOR Qualifier family description. The attribute "**lang**" indicates the language for the description; default language is English. Descriptions can be multiple, each with a different "**lang**" attribute

5.9 XML File: RequiredSkill.xml

Skill Code definition table, these defines the minimum skills required to perform the standard MOTOR operation.

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
1	MOTOR_RequiredSkill	Elements	(VersionDate, RequiredSkill +)		Yes		MOTOR Required Skill root element
2	VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
				extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)

#	Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
				mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
3	RequiredSkill	Elements	SkillName+, SkillDescription+)	skillcode	Yes	Yes	Unique code for each skill name and description. The attribute "**skillcode**" is referenced in **MOTOR_SST_wParts.XML as SkillCode**
4	SkillName	Elements	string	lang	Yes	No	MOTOR skill name. The attribute "**lang**" indicates the language for the description; default language is English. Descriptions can be multiple, each with a different "**lang**" attribute
5	SkillDescription	Elements	string	lang	Yes	No	MOTOR skill description. The attribute "**lang**" indicates the language for the description; default language is English. Descriptions can be multiple, each with a different "**lang**" attribute

5.10 XML File: MOTOR_SST_wParts.XML

The core SST table. The delivered files will be broken up by AAIA Make and MOTOR Operation name. The character "&" in the Operation name will be replaced by "_and_". An example delivery file name is "MOTOR_SST_Acura_Brake_Line_R_and_R.xml."

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
SST	Elements	(Header , App+ , Footer)	version	Yes	Yes	MOTOR EWT root element, attribute version indicates the SST specification version number
VersionDate	EMPTY		schema	Yes	Yes	Attribute "**schema**" indicates the schema version date (see date format note below)
			extraction		Yes	Attribute "**extraction**" indicates the extraction date (see date format note below)
			mtp		No	Attribute "**mtp**" indicates the MOTOR taxonomy version date, if applicable (see date format note below)
Header	Elements	(Company , SenderName , SenderPhone , SenderPhoneExt? , TransferDate , MfrCode? , DocumentTitle , DocFormNumber? , EffectiveDate , ApprovedFor? , SubmissionType , MapperCompany? , MapperContact? , MapperPhone? , MapperPhoneExt? , MapperEmail? , VcdbVersionDate , QdbVersionDate? , PcdbVersionDate , MOTOR_OperationVersionDate , MOTOR_QualifierVersionDate)		Yes		Header section describes data file information such as supplier, effective date, various data elements version dates etc.
Company	Type	String		Yes	N/A	Data supplier company name, MOTOR

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						Information Systems
SenderName	Type	String		Yes	N/A	Data supplier contact person name
SenderPhone	Type	String		Yes	N/A	Data supplier contact person phone number
SenderPhoneExt	Type	String		No	N/A	Data supplier contact person extension phone number
TransferDate	Type	String		Yes	N/A	Data file create date, formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year, “MM” represents two digit month and “DD” represents two digit day
MfrCode	Type	String		No	N/A	Vehicle manufacturer code
DocumentTitle	Type	String		Yes	N/A	Brief description of the contents in the document
DocFormNumber	Type	String		No	N/A	Data supplier’s document number, if available
EffectiveDate	Type	String		Yes	N/A	Date on which the data contents in the file are effective from. Formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year, “MM” represents two digit month and “DD” represents two digit day.
ApprovedFor	Type	String		No	N/A	ISO country code for which the data is approved. For US market the code is “US” and for Canada it is “CA”
SubmissionType	Type	String		Yes	N/A	Data submission type, TEST, FULL or UPDATE.

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						If the submission type is TEST or FULL, all applications in the file must have "action" attribute "A" to indicate "add" records. If the submission type is UPDATE, the "action" attribute can be either "A" for "add" records or "D" for "deleted" records. For the updated records, there will be two applications, one with action attribute "D" and other with action attribute "A". By default, MOTOR Information Systems will deliver data in FULL
MapperCompany	Type	String		No	N/A	Name of the company that mapped the data to AAIA standard data
MapperContact	Type	String		No	N/A	Contact person from the mapping
MapperPhone	Type	String		No	N/A	Mapping contact person's phone number
MapperPhoneExt	Type	String		No	N/A	Mapping contact person's extension phone number
MapperEmail	Type	String		No	N/A	Mapping contact person's e-mail address
VcdbVersionDate	Type	String		Yes	N/A	Version date from Vcdb database. Formatted as "CCYY-MM-DD", where "CC" represents century, "YY" represents two digit year, "MM" represents two digit month and "DD" represents two digit day
QdbVersionDate	Type	String		No	N/A	Version date from Qdb

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						database, if it is used in this data deliverable. Formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year, “MM” represents two digit month and “DD” represents two digit day
PcdbVersionDate	Type	String		Yes	N/A	Version date from Pcdb database. Formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year, “MM” represents two digit month and “DD” represents two digit day
MOTOR_OperationVersionDate	Type	String		Yes	N/A	MOTOR Operation Taxonomy version date. Formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year, “MM” represents two digit month and “DD” represents two digit day
MOTOR_QualifierVersionDate	Type	String		Yes	N/A	MOTOR Qualifiers version date. Formatted as “CCYY-MM-DD”, where “CC” represents century, “YY” represents two digit year. “MM” represents two digit month and “DD” represents two digit day.
App	Elements	(BaseVehicle, SubModel? , MfrBodyCode?, BodyNumDoors? , BodyType?	action id ref	Yes	Yes Yes No	Groups MOTOR Operation data as an application. The values

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
		, DriveType? , EngineBase? , EngineDesignation? , EngineVIN? , EngineVersion? , EngineMfr? , ValvesPerEngine? , FuelDeliveryType? , FuelDeliverySubType? , FuelSystemControlType? , FuelSystemDesign? , Aspiration? , CylinderHeadType? , FuelType? , IgnitionSystemType? , TransmissionMfrCode? , (TransmissionBase | (TransmissionType? , TransmissionControlType? , TransmissionNumSpeeds?))? , TransElecContolled? , TransmissionMfr? , TransferCaseBase? , TransferCase? , TransferCaseMfr? , BedLength? , BedType? , WheelBase? , BrakeSystem? , FrontBrakeType? , RearBrakeType? , BrakeABS? , FrontSpringType? , RearSpringType? , SteeringSystem? , SteeringType? , RestraintType? , Region? , Qual* , Note* , MfrLabel? , Position? , MOTOR_Operation , DisplayOrder?)?	validate		No	attribute “**action**” are “A” for “add” and “D” for “delete” applications. The attribute “**id**” uniquely identifies the application including base vehicle, vehicle attributes, MOTOR Operation and applicable MOTOR Qualifiers. The optional “**ref**” attribute references the source data. The optional “**validate**” attribute indicates if the application must be validated against Vcdb data. Possible values are “yes” and “no”
BaseVehicle	Type	String	id	Yes	Yes	VCdb Attribute. References the Base Vehicle table in Vcdb database. The attribute

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						"**id**" indicates the BaseVehicleID
SubModel	Type	String	id	No	Yes	VCdb Attribute. References the SubModel table in Vcdb database. The attribute "**id**" indicates the SubModelID.
MfrBodyCode	Type	String	id	No	Yes	VCdb Attribute. References the MfrBodyCode table. The attribute "**id**" indicates the MfrBodyCodeID
BodyNumDoors	Type	String	id	No	Yes	VCdb Attribute. References the BodyNumDoors table. The attribute "**id**" indicates the BodyNumDoorsID
BodyType	Type	String	id	No	Yes	VCdb Attribute. References the BodyType table. The attribute "**id**" indicates the BodyTypeID
DriveType	Type	String	id	No	Yes	VCdb Attribute. References the DriveType table. The attribute "**id**" indicates the DriveTypeID
EngineBase	Type	String	id	No	Yes	VCdb Attribute. References the EngineBase table. The attribute "**id**" indicates the EngineBaseID
EngineDesignation	Type	String	id	No	Yes	VCdb Attribute. References the EngineDesignation table. The attribute "**id**" indicates the

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						EngineDesignationID
EngineVIN	Type	String	id	No	Yes	VCdb Attribute. References the EngineVIN table. The attribute "**id**" indicates the EngineVINID
EngineVersion	Type	String	id	No	Yes	VCdb Attribute. References the EngineVersion table. The attribute "**id**" indicates the EngineVersionID
EngineMfr	Type	String	id	No	Yes	VCdb Attribute. The manufacturer that actually built the engine. References the Mfr table. The attribute "**id**" indicates the MfrID
ValvesPerEngine	Type	String	id	No	Yes	VCdb Attribute. References the Valves table. The attribute "**id**" indicates ValvesID
FuelDeliveryType	Type	String	id	No	Yes	VCdb Attribute. References the FuelDeliveryType table. The attribute "**id**" indicates FuelDeliveryTypeID
FuelDeliverySubType	Type	String	id	No	Yes	VCdb Attribute. References the FuelDeliverySubType table. The attribute "**id**" indicates FuelDeliverySubTypeID
FuelSystemControlType	Type	String	id	No	Yes	VCdb Attribute. References the FuelSystemControlType table. The attribute "**id**" indicates FuelSystemControlTypeI

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						D
FuelSystemDesign	Type	String	id	No	Yes	VCdb Attribute. References the FuelSystemDesign table. The attribute "**id**" indicates FuelSystemDesignID
Aspiration	Type	String	id	No	Yes	VCdb Attribute. References the Aspiration table. The attribute "**id**" indicates AspirationID
CylinderHeadType	Type	String	id	No	Yes	References the CylinderHeadType table. The attribute "**id**" indicates CylinderHeadTypeID
FuelType	Type	String	id	No	Yes	VCdb Attribute. References the FuelType table. The attribute "**id**" indicates FuelTypeID
IgnitionSystemType	Type	String	id	No	Yes	VCdb Attribute. References the IgnitionSystemType table. The attribute "**id**" indicates IgnitionSystemTypeID
TransmissionMfrCode	Type	String	id	No	Yes	VCdb Attribute. References the TransmissionMfrCode table. The attribute "**id**" indicates TransmissionMfrCodeID
TransmissionBase	Type	String	id	No	Yes	VCdb Attribute. References the TransmissionBase table. The attribute "**id**" indicates TransmissionBaseID
TransmissionType	Type	String	id	No	Yes	VCdb Attribute.

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						References the TransmissionType table. The attribute "**id**" indicates TransmissionTypeID
TransmissionControlType	Type	String	id	No	Yes	VCdb Attribute. References the TransmissionControlType table. The attribute "**id**" indicates TransmissionControlType ID
TransmissionNumSpeeds	Type	String	id	No	Yes	VCdb Attribute. References the TransmissionNumSpeeds table. The attribute "**id**" indicates TransmissionNumSpeeds ID
TransElecContolled	Empty		id	No	Yes	VCdb Attribute. References the ElecControlled table. The attribute "**id**" indicates ElecControlledID
TransmissionMfr	Type	String	id	No	Yes	VCdb Attribute. The manufacturer that actually built the transmission. References the Mfr table. The attribute "**id**" indicates MfrID
TransferCaseBase	Type	String	id	No	Yes	VCdb Attribute. References the TransferCaseBase table. The attribute "**id**" indicates TransferCaseBaseID
TransferCase	Type	String	id	No	Yes	VCdb Attribute. References the TransferCase table. The

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						attribute "**id**" indicates TransferCaseID
TransferCaseMfr	Type	String	id	No	Yes	VCdb Attribute. The manufacturer that actually built the Transfer Case. References the Mfr table. The attribute "**id**" indicates MfrID
BedLength	Type	String	id	No	Yes	VCdb Attribute. References the BedLength table. The attribute "**id**" indicates BedLengthID
BedType	Type	String	id	No	Yes	VCdb Attribute. References the BedType table. The attribute "**id**" indicates BedTypeID
WheelBase	Type	String	id	No	Yes	VCdb Attribute. References the WheelBase table. The attribute "**id**" indicates WheelBaseID
BrakeSystem	Type	String	id	No	Yes	VCdb Attribute. References the BrakeSystem table. The attribute "**id**" indicates BrakeSystemID
FrontBrakeType	Type	String	id	No	Yes	VCdb Attribute. The brake type used on the front wheels. References the BrakeType table. The attribute "**id**" indicates BrakeTypeID
RearBrakeType	Type	String	id	No	Yes	VCdb Attribute. The brake type used on the rear wheels. References the BrakeType table. The attribute "**id**" indicates BrakeTypeID

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
BrakeABS	Type	String	id	No	Yes	VCdb Attribute. References BrakeABS table. The attribute "**id**" indicates BrakeABSID
FrontSpringType	Type	String	id	No	Yes	VCdb Attribute. The basic suspension type used in the front of the vehicle. References the SpringType table. The attribute "**id**" indicates SpringTypeID
RearSpringType	Type	String	id	No	Yes	VCdb Attribute. The basic suspension type used in the rear of the vehicle. References the SpringType table. The attribute "**id**" indicates SpringTypeID
SteeringSystem	Type	String	id	No	Yes	VCdb Attribute. References the SteeringSystem table. The attribute "**id**" indicates SteeringSystemID
SteeringType	Type	String	id	No	Yes	VCdb Attribute. References the SteeringType table. The attribute "**id**" indicates SteeringTypeID
RestraintType	Type	String	id	No	Yes	VCdb Attribute. References the RestraintType table. The attribute "**id**" indicates RestraintTypeID
Region	Type	String	id	No	Yes	VCdb Attribute. Region where sold. References the Region table. The attribute "**id**" indicates RegionID. This element

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						will be rarely used with PMSST. In most cases, if region distinguishes between parts, a MOTOR qualifier will be used.
Qual	Elements	(param* , text)	id	No	Yes	**This element will be empty in the PMSST product. MOTOR Qualifiers are coded using Note.**
param	Type	String	value	Yes	Yes	**"param"** substitutes the value and "**uofm"** for Qdb qualifiers
			uom		No	
			altvalue		No	
			altuom		No	
text	Type	String	id	No	Yes	Additional qualifier text for the coded qualifier
Note	Type	String	id	No	No	Note element describes **MOTOR_Qualifiers** for the application. The attribute "id" refers to the attribute "**Qualifier.id**" in MOTOR_Qualifier.xml file "vehicleattribute" indicates if the MOTOR Qualifier is a vehicle attribute not covered by ACES specs
			lang		No	
			displayorder		No	
			vehicleattribute		No	
MfrLabel	Type	String		No	N/A	Manufacturer specific descriptions, if available
Position	Type	String	id	No	Yes	PCdb Attribute. References the AAIA Position table. (Part of the PCDB database provided by AAIA. MOTOR does not provide the Positions table). The attribute "**id**" indicates PositionID
MOTOR_Operation	Element	(SkillCode ,	id	Yes	Yes	Container for MOTOR

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
		Base_MOTOR_EWT, SST_Interval, IncludedOperation*, ReplacementPart?, Footnote*)				EWT. The attribute "**id**" refers to **OperationTaxonomy "id"** in **MOTOR_OperationTaxonomy.xml** file
SkillCode	Type	String	id	Yes	Yes	Skill required to perform the operation referred in the current application. Refers to "**RequiredSkill.skillcode**" attribute in **MOTOR_RequiredSkill.xml** file
Base_MOTOR_EWT	Type	String	minutes	Yes	Yes	MOTOR estimated work time for the base operation. The attribute "**minutes**" indicate the EWT in minutes
IncludedOperation	Elements	(IncludedOperation_Note* , IncludedOperation_Position? , Included_MOTOR_Operation)	id	No	Yes	Container for included operations for the current MOTOR operation. The attribute "**id**" is a MOTOR internal number
IncludedOperation_Note	Type	String	id	No	Yes	Included operation Note element describes MOTOR Qualifiers for the included operation. The attribute "id" refers to the attribute "**Qualifier.id**" in MOTOR_Qualifier.xml file. "**lang**" attribute may be used for multi-language qualifiers. "**displayorder**" will be used when the displaying qualifiers in an order is critical. "vehicleattribute"
			lang		No	
			displayorder		No	
			vehicleattribute		No	

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						indicates if the MOTOR Qualifier is a vehicle attribute not covered by ACES specs
IncludedOperation_Position	Type	String	id	No	Yes	PCdb Attribute. References the AAIA Position table. (Included in the AAIA ACES PCDB database). The attribute "**id**" indicates PositionID
Included_MOTOR_Operation	Type	String	id	No	Yes	The attribute "**id**" refers to **OperationTaxonomy "id"** in **MOTOR_OperationTaxonomy.xml** file
SST_Interval	Elements	(SST_IndicatorImage, SST_IndicatorText, SST_Frequency, SST_IntervalMile, SST_IntervalKM, SST_OperatingHours, SST_IntervalMonth, SST_Lube, SST_Warranty, SST_SevereService, SST_Note1, SST_Note2)	Id	Yes	Yes	
SST_IndicatorImage	Type	String		No		Image file name of art showing display on vehicle dashboard when indicator light service is required
SST_IndicatorText	Type	String		No		Text description of display on vehicle dashboard when indicator light service is required
SST_Frequency	Type	String	id	No	Yes	Frequency in which recommendation Operation should be performed. Relates to **Frequency.id** in

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						MOTOR_Frequency.xml
SST_IntervalMile	Type	String		No		Recommended maintenance interval in miles
SSTInterval_KM	Type	String		No		Recommended maintenance interval in kilometers
SST_OperatingHours	Type	String		No		Recommended maintenance interval in hours of vehicle operation
SST_IntervalMonth	Type	String		No		Recommended maintenance interval in months. Will be presented as a decimal with scale 1 (for example 5.0).
SST_Lube	Type	String	id	No	Yes	Recommended lubricant. Relates to **Lubricant.id** in **MOTOR_Lubricant.xml**
SST_Warranty	Type	String	id	No	Yes	Warranty protection advisory. Relates to **Warranty.id** in **MOTOR_ Warranty.xml**
SST_SevereService	Type	String	id	Yes	Yes	Severe service interval indicator (Y=yes; N=no) if indicated by the manufacturer. Recommended lubricant. Relates to **SevereService.id** in **MOTOR_ SevereService .xml**
SST_Note1	Type	String	id	No	Yes	Scheduled Service related notes data. Relates to **SST_Note.id** in **MOTOR_SST_Note .xml**
SST_Note2	Type	String	id	No	Yes	Scheduled Service

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						related notes data. Relates to **SST_Note.id** in **MOTOR_SST_Note .xml**
ReplacementPart	Elements	(PartType+)		No		Container for Parts applicable to the main operation
PartType	Elements	(OE_PartNumber, Position, Quantity)	id	Yes	Yes	PCdb Attribute. Part applicable to operation. The attribute "**id**" refers to PCDB Part Terminology ID The attribute **servicetype_id** references the MOTOR_ServiceType.xml file,
			servicetype_id		Yes	
OE_PartNumber	Type	String		Yes		OE Part Number
Position	Type	String	id	Yes	Yes	PCdb Attribute. References the AAIA Position table. (Included in the AAIA ACES PCDB database). The attribute "**id**" indicates PositionID
Quantity	Type	String		Yes		Quantity of components required for the given OE Part Number.
Operation_Footnote	Type	String	id	No	Yes	Footnotes applicable to main operations. The attribute "**id**" refers to "Footnote.id" in **MOTOR_Footnote.xml**
DisplayOrder	Type	String		No	Yes	Display order sequence number, when its required to display data in specific order.
Footer	Type	String		No	N/A	Container for footer tags, current specs call for

Element name	Content Type	Content Model	Attributes	Element Reqd.	Attribute Reqd.	Description
						Record count, which indicates total number of "**App**" elements in the file
RecordCount	Type	String		No	N/A	Indicates the number of (applications) "**App**" elements in the file

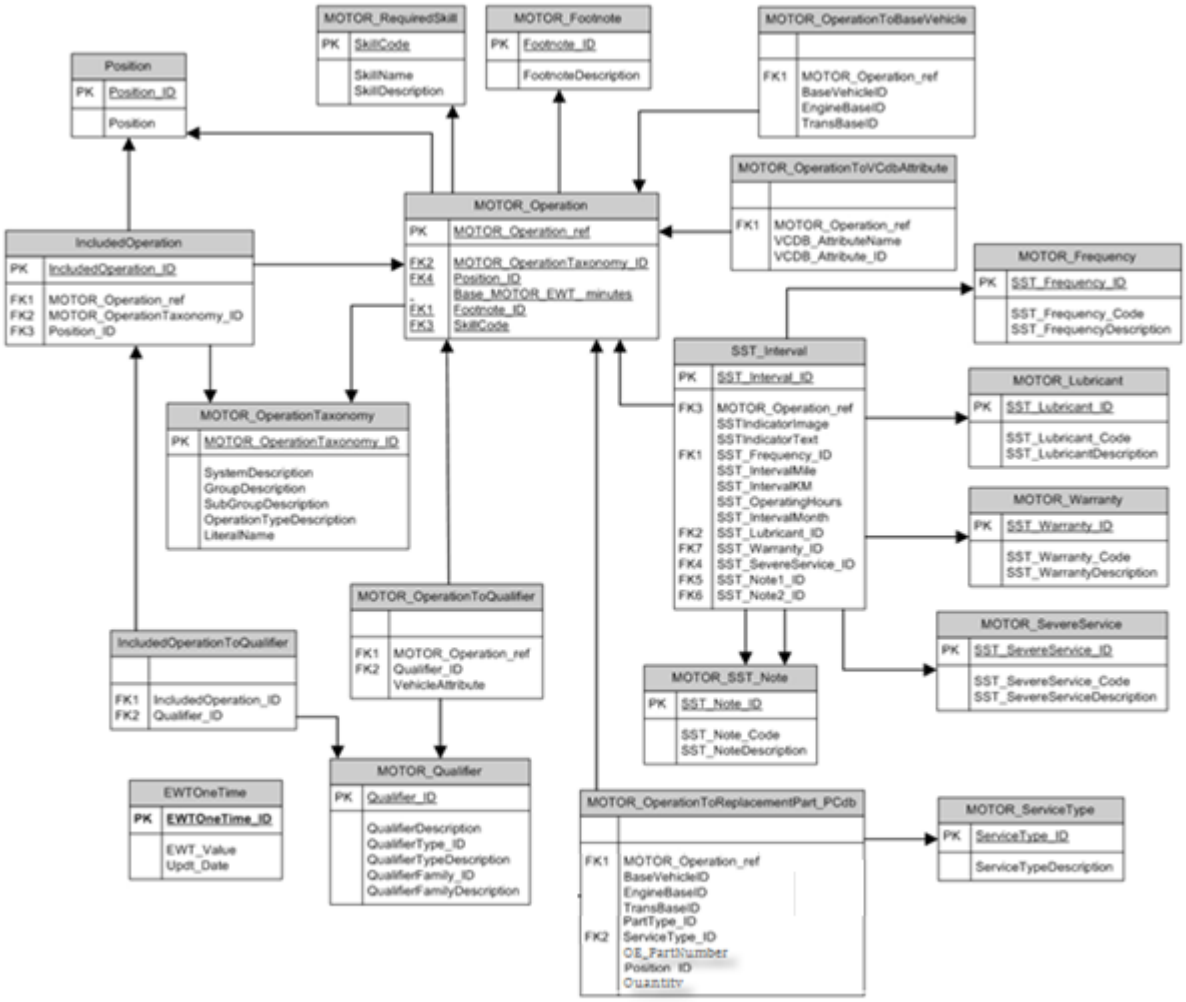
5.11 CSV File: EWTOneTime.csv

A recommended labor time value that should be added one time to each overall service instance. Its purpose is to account for administrative overhead consideration.

Name	Type	Size	Allow Nulls	Description
EWTOneTime_ID	Number	Long Integer	No	Primary Key
EWT_Value	Number	Integer	No	Estimated Work Time value expressed in whole minutes
Updt_Date	Date/Time		No	Update Date

NOTE: Date is formatted as "CCYY-MM-DD", where "CC" represents century, "YY" represents two digit year, "MM" represents two digit month and "DD" represents two digit day.

6 Sample Queries



The following sample queries assume that the delivery data has been imported into a relational database with the data model shown in the diagram above. In the above diagram, we did our best to match the field and table names with the elements found in the XML delivery and schema files. The above data model is only concerned with content and does not address other aspects that developers may be concerned with such as version control.

The above diagram and following queries do not include the Part Pricing attribute data. Please see the Part Price section of this document for more information on this subject.

Vehicle configuration handling can vary greatly depending on infrastructure and application requirements. For example, if non-ACES vehicle key is used in the GUI, then you will need

to determine how that vehicle key relates to VCdb and how the two should be mapped. Even when using the ACES vehicle key, there are different ways the vehicle configurations can be handled depending on requirements. For example, the application may require that engine is selected by the end user and thus the data would need to be exploded to VCdb Engine to query the correct data based customer input.

The following sample queries are designed as if the only VCdb vehicle coding applied to the data is BaseVehicleID (BaseVehicleID =1). This is the equivalent of Year, Make, Model, and Vehicle Type. The focus of these queries is the extraction of service intervals, developing a service labor time estimate, and gathering the PCdb part IDs that can be used to query a parts catalogue. Please note that these quires were used MS Access SQL syntax.

```
SELECT MOTOR_Operation.MOTOR_Operation_ref, MOTOR_OperationTaxonomy.LiteralName,
        Position.Position, MOTOR_Operation.[Base_MOTOR_EWT_ minutes],
        MOTOR_Footnote.FootnoteDescription, MOTOR_RequiredSkill.SkillName,
        SST_Interval.SST_Interval_ID, SST_Interval.SSTIndicatorImage,
        SST_Interval.SSTIndicatorText, MOTOR_Frequency.SST_Frequency_ID,
        MOTOR_Frequency.SST_Frequency_Code, MOTOR_Frequency.SST_FrequencyDescription,
        MOTOR_Lubricant.SST_Lubricant_Code, MOTOR_Lubricant.SST_LubricantDescription,
        MOTOR_SST_Note.SST_Note_Code AS SST_Note_Code1,
        MOTOR_SST_Note.SST_NoteDescription AS SST_NoteDescription1,
        MOTOR_SST_Note_1.SST_Note_Code AS SST_Note_Code2,
        MOTOR_SST_Note_1.SST_NoteDescription AS SST_NoteDescription2

FROM (MOTOR_Footnote RIGHT JOIN ((((MOTOR_Operation INNER JOIN
        MOTOR_OperationToBaseVehicle ON MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToBaseVehicle.MOTOR_Operation_ref) LEFT JOIN
        MOTOR_OperationTaxonomy ON MOTOR_Operation.MOTOR_OperationTaxonomy_ID =
        MOTOR_OperationTaxonomy.MOTOR_OperationTaxonomy_ID) LEFT JOIN [Position] ON
        MOTOR_Operation.Position_ID = Position.Position_ID) LEFT JOIN MOTOR_RequiredSkill
        ON MOTOR_Operation.SkillCode = MOTOR_RequiredSkill.SkillCode) ON
        MOTOR_Footnote.Footnote_ID = MOTOR_Operation.Footnote_ID) LEFT JOIN
        (((((SST_Interval LEFT JOIN MOTOR_SST_Note AS MOTOR_SST_Note_1 ON
        SST_Interval.SST_Note2_ID = MOTOR_SST_Note_1.SST_Note_ID) LEFT JOIN
        MOTOR_SST_Note ON SST_Interval.SST_Note1_ID = MOTOR_SST_Note.SST_Note_ID)
        LEFT JOIN MOTOR_Frequency ON SST_Interval.SST_Frequency_ID =
        MOTOR_Frequency.SST_Frequency_ID) LEFT JOIN MOTOR_Lubricant ON
        SST_Interval.SST_Lubricant_ID = MOTOR_Lubricant.SST_Lubricant_ID) LEFT JOIN
        MOTOR_Warranty ON SST_Interval.SST_Warranty_ID =
        MOTOR_Warranty.SST_Warranty_ID) ON MOTOR_Operation.MOTOR_Operation_ref =
        SST_Interval.MOTOR_Operation_ref

WHERE (((MOTOR_Frequency.SST_Frequency_ID) In (10,2081,4256,6,8,9)) AND
        ((MOTOR_OperationToBaseVehicle.BaseVehicleID)=1))
```

6.1 Maintenance set where time/distance interval values not defined (Frequency F, L, M, N, P, R)

This sample query shows de-normalized data for maintenance records that do not have specific intervals attached. This query does not bring in MOTOR Qualifiers, Included Operations, VCdb Attributes, Replacement Parts, and distance or time specific interval fields.

6.2 MOTOR_Operation set where Operation is dictated by Indicator Light

This sample query retrieves maintenance records for work that is required when a service indicator light is lit. Some records will have a description of the indicator that is shown on the vehicles dashboard. This field will be more fully populated as the product matures. Records that have a frequency code of "I" or have a value in the indicator text field fall into this category. If a record has a frequency of "I" and also mileage/km or time frequency data, then the operation should be performed at the interval (assumed to be frequency "Every") or when the indicator light is on; whichever comes first.

```
SELECT MOTOR_Operation.MOTOR_Operation_ref, MOTOR_OperationTaxonomy.LiteralName,
        Position.Position, MOTOR_Operation.[Base_MOTOR_EWT_ minutes],
        MOTOR_Footnote.FootnoteDescription, MOTOR_RequiredSkill.SkillName,
        SST_Interval.SST_Interval_ID, SST_Interval.SSTIndicatorImage,
        SST_Interval.SSTIndicatorText, MOTOR_Frequency.SST_Frequency_ID,
        MOTOR_Frequency.SST_Frequency_Code, MOTOR_Frequency.SST_FrequencyDescription,
        SST_Interval.SST_IntervalMile, SST_Interval.SST_IntervalKM,
        SST_Interval.SST_OperatingHours, SST_Interval.SST_IntervalMonth,
        MOTOR_Lubricant.SST_Lubricant_Code, MOTOR_Lubricant.SST_LubricantDescription,
        MOTOR_SST_Note.SST_Note_Code AS SST_Note_Code1,
        MOTOR_SST_Note.SST_NoteDescription AS SST_NoteDescription1,
        MOTOR_SST_Note_1.SST_Note_Code AS SST_Note_Code2,
        MOTOR_SST_Note_1.SST_NoteDescription AS SST_NoteDescription2

FROM (MOTOR_Footnote RIGHT JOIN ((((MOTOR_Operation INNER JOIN
        MOTOR_OperationToBaseVehicle ON MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToBaseVehicle.MOTOR_Operation_ref) LEFT JOIN
        MOTOR_OperationTaxonomy ON MOTOR_Operation.MOTOR_OperationTaxonomy_ID =
        MOTOR_OperationTaxonomy.MOTOR_OperationTaxonomy_ID) LEFT JOIN [Position] ON
        MOTOR_Operation.Position_ID = Position.Position_ID) LEFT JOIN MOTOR_RequiredSkill
        ON MOTOR_Operation.SkillCode = MOTOR_RequiredSkill.SkillCode) ON
        MOTOR_Footnote.Footnote_ID = MOTOR_Operation.Footnote_ID) LEFT JOIN
        (((((SST_Interval LEFT JOIN MOTOR_SST_Note AS MOTOR_SST_Note_1 ON
        SST_Interval.SST_Note2_ID = MOTOR_SST_Note_1.SST_Note_ID) LEFT JOIN
        MOTOR_SST_Note ON SST_Interval.SST_Note1_ID = MOTOR_SST_Note.SST_Note_ID)
        LEFT JOIN MOTOR_Frequency ON SST_Interval.SST_Frequency_ID =
        MOTOR_Frequency.SST_Frequency_ID) LEFT JOIN MOTOR_Lubricant ON
        SST_Interval.SST_Lubricant_ID = MOTOR_Lubricant.SST_Lubricant_ID) LEFT JOIN
        MOTOR_Warranty ON SST_Interval.SST_Warranty_ID =
        MOTOR_Warranty.SST_Warranty_ID) ON MOTOR_Operation.MOTOR_Operation_ref =
        SST_Interval.MOTOR_Operation_ref

WHERE (((MOTOR_Frequency.SST_Frequency_ID)=7) AND
        ((MOTOR_OperationToBaseVehicle.BaseVehicleID)=1)) OR
        (((SST_Interval.SSTIndicatorImage) Is Not Null)) OR (((SST_Interval.SSTIndicatorText) Is Not
        Null))
```

6.3 Get MOTOR Qualifiers for MOTOR_Operation set

Each MOTOR_Operation record in this data model, or each App element in the XML files, can be related to 0, 1, or more than one MOTOR Qualifier. It is important that an application takes the qualifiers into affect so that the same procedure is not duplicated and incorrect information is not included in a final estimate. If more than one Qualifier is attached to an Operation, then both Qualifiers must be true for the record to be relevant. A possible strategy for having an end user select the correct qualification is to concatenate multiple qualifiers into a single string. Some MOTOR Qualifiers are of the Qualifier Type “Vehicle Type”. These apply to the vehicle as a whole and not just the operation in context. The following sample query retrieves all the qualifiers for Indicator light type MOTOR_Operation records. The results of this query will have a null Qualifier value if there are no Qualifiers attached and empty string Operation Taxonomy value if the qualifier is a Vehicle Attribute Qualifier.

```
SELECT MOTOR_Operation.MOTOR_Operation_ref,
        IIf([MOTOR_OperationToQualifier].[VehicleAttribute]=Yes,"",[MOTOR_OperationTaxonomy].
        [LiteralName]) AS Operation, MOTOR_OperationToQualifier.VehicleAttribute,
        MOTOR_Qualifier.Qualifier_ID, MOTOR_Qualifier.QualifierDescription,
        MOTOR_Qualifier.QualifierType_ID, MOTOR_Qualifier.QualifierTypeDescription,
        MOTOR_Qualifier.QualifierFamily_ID, MOTOR_Qualifier.QualifierFamilyDescription
FROM (((MOTOR_Operation INNER JOIN MOTOR_OperationToBaseVehicle ON
        MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToBaseVehicle.MOTOR_Operation_ref) LEFT JOIN
        MOTOR_OperationTaxonomy ON MOTOR_Operation.MOTOR_OperationTaxonomy_ID =
        MOTOR_OperationTaxonomy.MOTOR_OperationTaxonomy_ID) LEFT JOIN
        MOTOR_OperationToQualifier ON MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToQualifier.MOTOR_Operation_ref) LEFT JOIN MOTOR_Qualifier ON
        MOTOR_OperationToQualifier.Qualifier_ID = MOTOR_Qualifier.Qualifier_ID
WHERE (((MOTOR_OperationToBaseVehicle.BaseVehicleID)=1))
```

6.4 Get Replacement Parts for a set of MOTOR_Operation records

The following sample query demonstrates how to retrieve AAIA Part Type ID codes that can be used to retrieve part numbers and related information for a part application database coded to PCdb. This query retrieves part types for all records for a BaseVehicleID. This query uses a table Parts that is not in the above diagram. This table can be found in the AAIA ACES PCdb database that is made available to subscribers.

```
SELECT MOTOR_Operation.MOTOR_Operation_ref,
        MOTOR_OperationToReplacementPart_PCdb.PartType_ID,
        MOTOR_ServiceType.ServiceType_ID, MOTOR_ServiceType.ServiceTypeDescription,
        Parts.PartTerminologyID, Parts.partterminologyname
FROM Parts INNER JOIN (((MOTOR_Operation INNER JOIN MOTOR_OperationToBaseVehicle ON
        MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToBaseVehicle.MOTOR_Operation_ref) LEFT JOIN
        MOTOR_OperationTaxonomy ON MOTOR_Operation.MOTOR_OperationTaxonomy_ID =
        MOTOR_OperationTaxonomy.MOTOR_OperationTaxonomy_ID) INNER JOIN
        (MOTOR_OperationToReplacementPart_PCdb INNER JOIN MOTOR_ServiceType ON
        MOTOR_OperationToReplacementPart_PCdb.ServiceType_ID =
        MOTOR_ServiceType.ServiceType_ID) ON MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToReplacementPart_PCdb.MOTOR_Operation_ID) ON
        Parts.PartTerminologyID = MOTOR_OperationToReplacementPart_PCdb.PartType_ID
WHERE (((MOTOR_OperationToBaseVehicle.BaseVehicleID)=1));
```

6.5 Explode Schedule Service Times to individual mileage intervals for specific vehicle.

The following steps demonstrate a portion of a potential method for creating an estimate for scheduled service using the SST database. The steps below only consider recommended services based on mileage. It is important that all relevant types of recommendations (including recommendations by months, indicator light, etc.) are also taken into affect. These queries include the gathering of PCdb Part Type IDs but not how to use them to fetch part prices. as that process will vary based on the provider dataset.

6.5.1 Append Frequency values of 1 (1st), 2 (2nd) and A (at) to temporary table

The following query will create TempTable1, populated with one time maintenance interval records where the value in the SSTInterval_Miles value in SST_Interval equals the mileage on the vehicle's odometer. For simplicity, this query is only exporting the foreign keys to the related look-up tables. Qualifiers are not part of this query but will be addressed in the following steps. Not all of the interval fields are included in the following query. The required fields will vary by application.

```
SELECT MOTOR_Operation.MOTOR_Operation_ref,
        MOTOR_Operation.MOTOR_OperationTaxonomy_ID, MOTOR_Operation.Position_ID,
        MOTOR_Operation.[Base_MOTOR_EWT_ minutes], MOTOR_Operation.Footnote_ID,
        MOTOR_Operation.SkillCode, SST_Interval.SST_Interval_ID, SST_Interval.SSTIndicatorImage,
        SST_Interval.SSTIndicatorText, SST_Interval.SST_Frequency_ID,
        SST_Interval.SST_IntervalMile, SST_Interval.SST_IntervalMonth,
        SST_Interval.SST_Lubricant_ID, SST_Interval.SST_Warranty_ID,
        SST_Interval.SST_SevereService_ID, SST_Interval.SST_Note1_ID,
        SST_Interval.SST_Note2_ID, "" AS Qualifier INTO TempTable1
FROM (MOTOR_Operation INNER JOIN MOTOR_OperationToBaseVehicle ON
        MOTOR_Operation.MOTOR_Operation_ref =
        MOTOR_OperationToBaseVehicle.MOTOR_Operation_ref) INNER JOIN SST_Interval ON
        MOTOR_Operation.MOTOR_Operation_ref = SST_Interval.MOTOR_Operation_ref
WHERE (((SST_Interval.SST_Frequency_ID) In (1,2,3)) AND
        ((MOTOR_OperationToBaseVehicle.BaseVehicleID)=1));
```

6.5.2 Append Frequency "E" to temporary table

The Frequency value of "E" indicates that the Operation is performed at every mileage that is a multiple of the SST_IntervalMile value up until a max interval you choose to present. Generally, OE scheduled maintenance schedules are valid for intervals up to between 150,000 and 250,000 miles. Typically end users will want to see data for intervals within a range greater than and less than the vehicles current mileage.

To append the "E" intervals, cycle through each Interval_ID for the vehicle in context with an SST_Frequency_ID of 5 and append incrementing multiples of the SST_IntervalMile value until the max value desired has been reached or exceeded. The following is an example append query for an individual multiple based on the table TempTable1 created above. Replace ***x*** value for an incrementing integer. This query uses representative SST_Interval_ID of 1.

```
INSERT INTO TempTable1 ( MOTOR_Operation_ref, MOTOR_OperationTaxonomy_ID, Position_ID,
        [Base_MOTOR_EWT_ minutes], Footnote_ID, SkillCode, SST_Interval_ID,
        SSTIndicatorImage, SSTIndicatorText, SST_Frequency_ID, SST_IntervalMile,
        SST_IntervalMonth, SST_Lubricant_ID, SST_Warranty_ID, SST_SevereService_ID,
        SST_Note1_ID, SST_Note2_ID )
SELECT MOTOR_Operation.MOTOR_Operation_ref,
        MOTOR_Operation.MOTOR_OperationTaxonomy_ID, MOTOR_Operation.Position_ID,
        MOTOR_Operation.[Base_MOTOR_EWT_ minutes], MOTOR_Operation.Footnote_ID,
        MOTOR_Operation.SkillCode, SST_Interval.SST_Interval_ID,
        SST_Interval.SSTIndicatorImage, SST_Interval.SSTIndicatorText,
        SST_Interval.SST_Frequency_ID, [SST_IntervalMile]*x AS Expr1, [SST_IntervalMonth]*x AS
        Expr2, SST_Interval.SST_Lubricant_ID, SST_Interval.SST_Warranty_ID,
        SST_Interval.SST_SevereService_ID, SST_Interval.SST_Note1_ID,
        SST_Interval.SST_Note2_ID
FROM MOTOR_Operation INNER JOIN SST_Interval ON MOTOR_Operation.MOTOR_Operation_ref
        = SST_Interval.MOTOR_Operation_ref
WHERE (((SST_Interval.SST_Interval_ID)=1));
```

6.5.3 Append Frequency "X" to temporary table

The Frequency value of "X" indicates the interval values are for every multiple of the SST_IntervalMile value after 1 or 2 initial service instances. This frequency should be handled the same as "E" with the exception that the initial service, 2 if existent or 1 if not, needs to be added to each multiple value. The following sample query shows how to retrieve the initial service value to append to an interval multiple for a unique Vehicle, MOTOR_Operation_ref, SST_SevereService_ID, Position, and MOTOR_OperationTaxonomy_ID combination. After retrieving the initial Mileage and Months, use the logic for the "E" frequency process and add the initial value to each Mileage and Month value.

Note: There is a potential that, early in the product's life, there are instances where an interval record relates to a MOTOR_Operation_ref record without a corresponding "1" or "2" interval. This can happen if the qualifiers or VCdb Attributes differ from those of the "x" record. In this case you will need to look at the other MOTOR_Operation records with the same combination of MOTOR_OperationTaxonomy_ID and SST_SevereService_ID to find the initial mileage record.

```
SELECT SST_Interval.SST_IntervalMile, SST_Interval.SST_IntervalMonth, SST_Interval.Position_ID
FROM SST_Interval
WHERE (((SST_Interval.MOTOR_Operation_ref)=1) AND
        ((SST_Interval.SST_SevereService_ID)=2079) AND ((SST_Interval.Position_ID)=1))
GROUP BY SST_Interval.SST_IntervalMile, SST_Interval.SST_IntervalMonth,
        SST_Interval.Position_ID
HAVING (((Max(SST_Interval.SST_Frequency_ID)) In (1,2)))
```

6.5.4 Add Qualifiers

Use the following query to retrieve all qualifier values related to the MOTOR_Operation_ref values in TempTable1. A single record could have more than one qualifier. For this hypothetical method, cycle through the qualifiers for each MOTOR_Operation_ref and concatenate multiple qualifiers for a single MOTOR_Operation_ref and delaminate by comma. Update the TempTable1 Qualifier field with these values. This query assumes that vehicle qualifiers and non-vehicle qualifiers are being treated equally and should be presented to end user for selection when creating the estimate.

```
SELECT TempTable1.MOTOR_Operation_ref, MOTOR_Qualifier.QualifierDescription
FROM (MOTOR_OperationToQualifier INNER JOIN MOTOR_Qualifier ON
        MOTOR_OperationToQualifier.Qualifier_ID = MOTOR_Qualifier.Qualifier_ID) INNER JOIN
        TempTable1 ON MOTOR_OperationToQualifier.MOTOR_Operation_ref =
        TempTable1.MOTOR_Operation_ref
GROUP BY TempTable1.MOTOR_Operation_ref, MOTOR_Qualifier.QualifierDescription
```

6.5.5 Create Customer Selection Table

The following two queries create a customer selection table. The first query appends the **maximum** Mileage value that **is less than or equal to** an end user entered vehicle mileage for each combination of MOTOR_OperationTaxonomy_ID, SST_ServerService_ID and Qualifier. The second query appends the **minimum** Mileage value that **is greater than** an end user entered vehicle mileage for each combination of MOTOR_OperationTaxonomy_ID, SST_ServerService_ID, Position_ID, and Qualifier. This table will also need a True/False column (not created by this query) to represent the end user selection. It is important to understand that often the same combination of MOTOR_OperationTaxonomy_ID, SST_ServerService_ID, Position_ID, and Qualifier will appear twice, once for the max mileage before current and once for the min mileage after current. In these cases the end user should not be allowed to select both cases.

```
SELECT TempTable1.* INTO TempTable2
FROM TempTable1 INNER JOIN
        (SELECT TempTable1.MOTOR_OperationTaxonomy_ID, TempTable1.SST_SevereService_ID,
                TempTable1.Qualifier, TempTable1.Position_ID, Max(TempTable1.SST_IntervalMile)
                AS MaxMiles, First(TempTable1.SST_IntervalMonth) AS MaxMonth
         FROM TempTable1
        GROUP BY TempTable1.MOTOR_OperationTaxonomy_ID,
                TempTable1.SST_SevereService_ID, TempTable1.Qualifier, TempTable1.Position_ID
        HAVING (((Max(TempTable1.SST_IntervalMile))<=60000 And
                (Max(TempTable1.SST_IntervalMile)) Is Not Null)))  AS MaxMilesTable

        ON (TempTable1.SST_IntervalMonth = MaxMilesTable.MaxMonth) AND
        (TempTable1.SST_IntervalMile = MaxMilesTable.MaxMiles) AND (TempTable1.Qualifier =
        MaxMilesTable.Qualifier) AND (TempTable1.SST_SevereService_ID =
        MaxMilesTable.SST_SevereService_ID) AND (TempTable1.MOTOR_OperationTaxonomy_ID
        = MaxMilesTable.MOTOR_OperationTaxonomy_ID) AND (TempTable1.Position_ID =
        MaxMilesTable.Position_ID)
```

```
INSERT INTO TempTable2
SELECT TempTable1.*
FROM TempTable1 INNER JOIN
        (SELECT TempTable1.MOTOR_OperationTaxonomy_ID, TempTable1.SST_SevereService_ID,
                TempTable1.Qualifier, TempTable1.Position_ID, Min(TempTable1.SST_IntervalMile)
                AS MinMiles, First(TempTable1.SST_IntervalMonth) AS MinMonth
        FROM TempTable1
        GROUP BY TempTable1.MOTOR_OperationTaxonomy_ID,
                TempTable1.SST_SevereService_ID, TempTable1.Qualifier, TempTable1.Position_ID
        HAVING (((Min(TempTable1.SST_IntervalMile))>60000 And
                (Min(TempTable1.SST_IntervalMile)) Is Not Null)))  AS MinMilesTable

        ON (TempTable1.Position_ID = MinMilesTable.Position_ID) AND
        (TempTable1.MOTOR_OperationTaxonomy_ID =
        MinMilesTable.MOTOR_OperationTaxonomy_ID) AND (TempTable1.SST_SevereService_ID
        = MinMilesTable.SST_SevereService_ID) AND (TempTable1.Qualifier =
        MinMilesTable.Qualifier) AND (TempTable1.SST_IntervalMile = MinMilesTable.MinMiles)
        AND (TempTable1.SST_IntervalMonth = MinMilesTable.MinMonth)
```

6.5.6 Calculate Total EWT in Minutes

The following sample query shows how to get the total EWT in minutes for items selected as True in TempTable2. The EWTOneTime table provides a value that can be used to cover the shop overhead time, represented by the 13 minutes in the query below.

```
SELECT Sum(TempTable2.[Base_MOTOR_EWT_ minutes])+13 AS Minutes
FROM TempTable2
WHERE (((TempTable2.Selected)=Yes));
```

6.5.7 Get Replacement Parts

The following sample query shows how to retrieve PCdb IDs of parts that are likely needed to be replaced for the selected Operations.

```
SELECT TempTable2.SST_Interval_ID, MOTOR_OperationToReplacementPart_PCdb.PartType_ID
FROM TempTable2 INNER JOIN MOTOR_OperationToReplacementPart_PCdb ON
        TempTable2.MOTOR_Operation_ref =
        MOTOR_OperationToReplacementPart_PCdb.MOTOR_Operation_ID
WHERE (((MOTOR_OperationToReplacementPart_PCdb.ServiceType_ID)=2) AND
        ((TempTable2.Selected)=Yes))
GROUP BY TempTable2.SST_Interval_ID,
        MOTOR_OperationToReplacementPart_PCdb.PartType_ID
```

6.5.1 Get Included Operations

Included Operations are not common in the SST product but may need to be considered based on application requirements. Included Operations will help to identify when major Operations are repeated because two or more selected Operations include the same Operation, or an included Operation on one record is the same as a selected main Operation. The query below retrieves the Included Operations data for the selected Operations. Once this data is collected it can be processed to determine if more than one selected Operation contains the same Included Operation, or if selected Operation is a repeat of an included Operation on another record. This information can then be presented to the end user so the estimate can be adjusted accordingly.

When processing Included Operations, it is important to understand that a Position_ID of 1 indicates that Position does not matter and if another Included Operation with the same taxonomy is present then there is overlap, no matter the position attached to the second record. Similarly, if an Included Operation does not have a qualifier attached, it overlaps with another Included Operation with any qualifier attached.

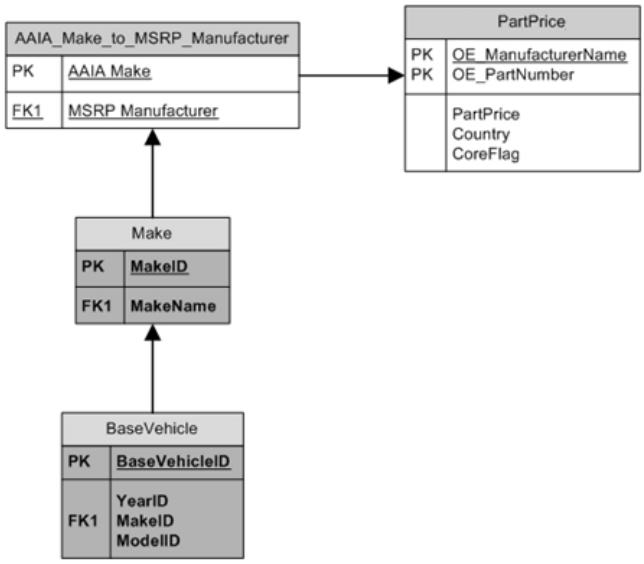
```
SELECT TempTable2.MOTOR_Operation_ref, IncludedOperation.IncludedOperation_ID,
        IncludedOperation.MOTOR_OperationTaxonomy_ID, IncludedOperation.Position_ID,
        IncludedOperationToQualifier.Qualifier_ID
FROM TempTable2 INNER JOIN (IncludedOperation LEFT JOIN IncludedOperationToQualifier ON
        IncludedOperation.IncludedOperation_ID =
        IncludedOperationToQualifier.IncludedOperation_ID) ON
        TempTable2.MOTOR_Operation_ref = IncludedOperation.MOTOR_Operation_ref
```

7 Part Pricing

The PMSST with OE parts ACES database provides part pricing where available from our GEN5 OE parts database to be used in the development of estimates. This dataset provides a single representative Part Number and Price for each combination of the vehicle list applicable to each App (Year, Make, Model, Engine), Part Type and Position.

The part pricing data will be delivered in separate CSV files on a monthly basis. The pricing files delivered for the months between the quarterly PMSST deliveries will use the same OE part numbers as delivered the previous quarter. US pricing will be used whenever available. In the small number of cases where a US price is not available but a Canadian price is, the Canadian price will be delivered. Canadian prices will not be delivered when a US price is available.

7.1 Pricing ERD



Please note the tables filled in Grey come from the AAAIA ACES VCdb database and are not provided by MOTOR.

7.2 AAIA_Make_to_MSRP_Manufacturer

Provides the relationship between the MSRP Manufacturer name found in the Price File with the AAIA Make Name associated with a Base Vehicle ID in VCdb

Column Name	DataType (size)	Allow Null	Constraints	Indexes	Description
AAIA Make	Text (50)	No		PK	AAIA VCdb Make name
MSRP Manufacturer	Text (50)	No			MSRP Manufacturer name found in the Price File

7.3 PartPrice_(Manufacturer)

This table provides the MSRP for the OE part numbers. There is one price provided for each combination of OE Manufacturer and OE Part Number Combination.

Column Name	DataType (size)	Allow Null	Constraints	Indexes	Description
OE_PartNumber	Text (255)	No		PK	OE Part Number. The Part Numbers are presented in the format provided by the OEMs.
OE_ManufacturerName	Text (50)	No		PK	MSRP Manufacturer name found

					in the Price File
PartPrice	Currency	No			MSRP. 0 value indicates that price is not available.
Country	Text (50)	No			Part price country of origin. US price is provided where available. Canadian price only provided if available and US price is not. Possible values are “US” and “Canada”.
CoreFlag	Integer	Yes			A value of 1 indicates that the MSRP is net return of the core. The value 0 indicates that the MSRP is not net return of the core.

8 Data Usage Requirements

8.1 Presenting EWT values

All EWT fields need to be displayed as minutes. It is important not to describe the work minutes as “units” or similar descriptive term that may allow the value to be perceived or interpreted as anything other than actual estimated work times.

9 Data Usage Tips

9.1 Using MOTOR Qualifiers to Extended Vehicle Definitions

The MOTOR Qualifiers dataset can be used to extend vehicle definitions beyond the ACES VCdb standard. All vehicle definition qualifiers are assigned to the Qualifier Type of “Vehicle Attribute.” These qualifiers are then further qualified by Qualifier Family. The grouping of the Qualifier family is based on the standard that only one Qualifier within a Qualifier Family can be true for a specific physical vehicle at a time. For example, “With Air Conditioning” and “Without Air Conditioning” are in the same family because both cannot be true about the same vehicle at the same time. By attaching declared vehicle attribute qualifiers to a unique physical vehicle, perhaps represented by VIN, an application can then predetermine that an application is not likely to apply to a vehicle if there is a vehicle attribute qualifier attached that belongs to a family wherein another qualifier from that same family has been declared for that vehicle. However, this qualifier classification is not perfect for all qualifier families. It is suggested that this logic is not used to hide data, but rather to promote specific data to the top of the list.

9.2 Quantity (EWT)

Unless specified otherwise in the Operation Footnote, the EWT attached to each MOTOR_Operation instance includes action to all instances of the implied component that

relate to the combination of MOTOR_Taxonomy, Position, and Qualifier in context. For example, if the Operation is Accessory Drive Belt Inspect, the position is N/A, and there are no Qualifiers attached, the EWT is the time required to inspect all of the Accessory Drive Belts.

The provided data does not indicate the quantity of the components that may need to be replaced as part of the Operation.

9.3 EWT Overlap (Included Operations)

Often times, the EWT given for an Operation includes the time to perform an important prerequisite operation which could be shared with other operations. If multiple Operations are required that each contain these included operations. a scenario may result where the labor time includes performing the same tasks multiple times. This is referred to as overlap. The data presents overlap in two ways. First, the footnote attached to the operations will, when necessary, indicate the major operations that are included in the EWT. By reviewing the footnotes of the operations selected, the end user can be exposed to this overlap. Second, every application that includes a footnote indicating an included operation will also be tagged with the ID of the Operation's taxonomy path. The user application can query selected Operations to check for instances where they are attached to the same taxonomy ID. This ID could then be used to fetch any available labor times for the included operation to aid in the overlap calculation.

9.4 Getting the most of the App "ref" Attribute

Each application is delivered with an attribute of "ref." This attribute can be utilized to increase performance if parsing the XML output files into a SQL relational database by compressing the data. Each application which shares an equivalent ref have the same MOTOR Operation Name, set of Notes, set of VCdb Attributes (with the exception of EngineBaseID, and TransBaseID), Position, EWT, set of SST Intervals, set of Included Operations, set of Replacement Parts and Operation Footnote. App records with the same "ref" can have differing BaseVehicleID, EngineBaseID, and TransBaseID.

The ref attribute is also a useful tool when communicating feedback to MOTOR. This ID will allow us to reference exactly the piece of data of concern.

9.5 Multiple indicators on the dash

Some vehicles can have multiple indicators displayed on the dashboard when maintenance is required. For example, some Honda can show an "A" or a "B" indicator with multiple indicators with numeric values. The indicators are presented in our data in the "SST_IndicatorImage" and "SST_IndicatorText." Each indicator will have its own series of records. Therefore, a GUI that allows selection of these indicators should allow for the selection of multiple indicators and create an aggregate list of Operations based on selected indicators.

9.6 Part Type/Pricing Coverage

The part numbers and pricing included with this dataset are sourced from MOTOR GEN5 Parts database. This database covers most of the parts that are called out as replacement parts in the PMSST data. However, a few of the rarely called out part types are not covered at this time. Additionally, there are other parts such as tires and fluids that the OEs do not provide part numbers and/or pricing. The part names that are used in the data are the PCdb part types. There are cases in PCdb where MOTOR editors believe that more than PCdb part type name are referencing the same conceptual part. If there is more than PCdb part type that references a single conceptual part type, MOTOR will only use when of the part names when authoring the part number data. However, all of the related PCdb part types will still be listed as replacement parts in the PMSST ACES with Parts deliverable. Consequentially, there will be many part types listed as replacement parts where MOTOR will not be providing a part number but the data is covered under a different Part Type. The following table lists the PCdb part types that are used as of 8/20/2010 and indicates rather or not MOTOR currently provides part numbers for each part type. There are also comments indicating those that may require special processing depending on the application. The following parts are listed in descending order based on number of callouts in the data.

PartTerminologyID	PartTerminologyName	Part Coverage	Comments
8900	Accessory Drive Belt	Yes	
8905	Serpentine Belt	Yes	
6892	HVAC Heater Hose	Yes	
5132	Oxygen Sensor	Yes	
6200	Fuel Filter	Yes	
1792	Brake Hydraulic Hose	See Comments	Coded as 10850 - Disc Brake Hydraulic Hose and/or 10850 Drum Brake Hydraulic Hose
10068	Radiator Coolant Hose	Yes	
10443	Engine Balance Shaft Belt	Yes	
14167	Air Pump Belt	See Comments	Coded as 8900 - Accessory Drive Belt
13861	Suspension Self-Leveling Pump Belt	See Comments	Coded as 8900 - Accessory Drive Belt
13036	A/C Drive Belt	See Comments	Coded as 8900 - Accessory Drive Belt
13034	Alternator Drive Belt	See Comments	Coded as 8900 - Accessory Drive Belt
11665	Distributor Drive Belt	See Comments	Coded as 8900 - Accessory Drive Belt
11252	Supercharger Belt	See Comments	Coded as 8900 - Accessory Drive Belt
11552	Engine Cooling Fan Drive Belt	See Comments	Coded as 8900 - Accessory Drive Belt
6832	Cabin Air Filter	Yes	

10850	Disc Brake Hydraulic Hose	Yes	If an App has 10851 with the same position, you will only need one of the parts; not both.
5716	Engine Timing Belt	Yes	
7212	Spark Plug	Yes	
6208	Fuel Pump Filter	See Comments	Coded as 6200 - Fuel Filter
6216	Fuel Water Separator Filter	See Comments	Coded as 6200 - Fuel Filter
12367	Fuel Injection Throttle Body Injector Filter	See Comments	Coded as 6200 - Fuel Filter
12937	Fuel Injection Pump Filter	See Comments	Coded as 6200 - Fuel Filter
6192	Air Filter	Yes	
7324	Power Steering Return Hose	Yes	
1672	Wheel Bearing	Yes	
7228	Spark Plug Wire Set	Yes	
10851	Drum Brake Hydraulic Hose	Yes	If an App has 10850 with the same position, you will only need one of the parts; not both.
5052	PCV Valve	Yes	
10964	Auto Trans Filter	Yes	
1820	Brake Hydraulic Line	See Comments	Coded as 10850 - Disc Brake Hydraulic Hose and/or 10851 Drum Brake Hydraulic Hose
10507	Wheel Seal	Yes	
2155	Engine Coolant By-Pass Hose	Yes	
14338	Brake Hydraulic Line Kit	See Comments	Coded as 10850 - Disc Brake Hydraulic Hose and/or 10851 Drum Brake Hydraulic Hose
5340	Engine Oil Filter	Yes	
7636	Tire	No	Pricing is normally not provide by OEM
6268	Fuel Tank	Yes	
7320	Power Steering Pressure Hose	Yes	
5808	Catalytic Converter	Yes	
4968	EGR Valve	Yes	
5721	Engine Timing Belt Tensioner	Yes	
13630	Manual Trans Fluid	No	Pricing is normally not provide by OEM
11387	Auto Trans Fluid	No	Pricing is normally not provide by OEM
8852	Windshield Wiper Blade	Yes	
7325	Power Steering Suction Hose	See Comments	Coded as 7320 - Power Steering Pressure Hose or 7324 Power Steering Return Hose
5180	Vapor Canister	Yes	

14146	Engine Crankcase Breather Filter		
12036	Remote Tire Pressure Monitor Sensor	Yes	
13113	Power Steering Cylinder Hose	See Comments	Coded as 7320 - Power Steering Pressure Hose or 7324 Power Steering Return Hose
11224	Fuel Line	No	Not currently covered
10710	Engine Valve Cover Gasket	Yes	
12036	Tire Pressure Monitoring System (TPMS) Sensor	Yes	
11659	Belt Tensioner	Yes	
2155	Engine Coolant By Pass Hose	Yes	
5900	Fuel Tank Cap	Yes	
12036	Remote Tire Pressure Sensor	Yes	
15538	EGR Valve Control Solenoid Filter	No	Not currently covered
4996	Air Pump Filter	Yes	
2476	Battery	Yes	
13035	A/C Drive Belt Tensioner	See Comments	Coded as 11659 - A/C Drive Belt Tensioner
2424	Alternator Brush Set	No	Not currently covered
5092	EGR Valve Position Sensor	Yes	
14426	Engine Timing Belt Idler	No	Not currently covered
5428	Engine Oil Drain Plug Gasket	Yes	
1508	Air Bag Module	No	Not currently covered
5892	Accelerator Cable	No	Not currently covered
15328	Suspension Air Compressor Filter	No	Not currently covered
15321	Fuel Injector Sleeve	No	Not currently covered
7152	Diesel Glow Plug	Yes	
5512	Engine Harmonic Balancer	No	Not currently covered

9.6.1 Abstract Part Numbers

Abstract values are used when an OE part number is not available.

- **NA** – Used to indicate when a component is **N**ot **A**vailable. For example, the vehicle has a Brake Master Cylinder, but does not have a Brake Master Cylinder Repair Kit. In this case, the Brake Master Cylinder Repair Kit would be listed as NA, indicating Not Available.
- **NPI** – Used to indicate **N**o **P**arts **I**nformation is available for a particular component, and MOTOR does not expect to receive information. If MOTOR anticipates the information will be available at a later date, NPI would not be used, and the record would be left as a hole.
- **NR** – Used to indicate a particular component is **N**ot **R**equired. For example, a Clutch Friction Disc would be listed as NR on a vehicle that is Auto Trans only.

- **NSS –**Used to indicate when a component is **N**ot **S**erviced **S**eparately, and is serviced as part of another component. For example, a Window Regulator is only serviced with the Power Window Motor; the Window Regulator would be listed as NSS.
- **OS –** Used to indicate a vehicle is **O**ut of **S**cope. For example, Toyota does not provide MOTOR with parts information for the LFA. This vehicle would be populated with OS to indicate it is out of the scope of coverage.