National Fire Incident Reporting System Version 5.0 Fire Data Analysis Guidelines and Issues

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INTRODUCTION

This document discusses analytic considerations and methods of analyzing fire incident data using the U.S. Fire Administration's (USFA's) National Fire Data Center's (NFDC's) National Fire Incident Reporting System (NFIRS), Version 5.0. The topics include the NFIRS 5.0 data structure, general quality assurance (QA) issues, and definitions and parameters of common fire analyses (e.g., residential structure fires or fires by a specific cause).

The methods, techniques, and considerations discussed are those used by USFA analysts and do not necessarily reflect methods, techniques, and considerations used by fire data analysts from other agencies and organizations. NFIRS data partners may (and do) employ their own methods for analyzing the data and may make differing assumptions when encountering data issues.

NFIRS 5.0 DATA STRUCTURE

This section notes some elements of the NFIRS 5.0 data structure that must be understood for general analysis. The complete structure of NFIRS 5.0 is detailed in the *NFIRS Version 5.0 System Documentation*. The most recent version of the system documentation is on the USFA NFIRS website, at http://www.nfirs.fema.gov/documentation/.

NFIRS has undergone several major changes in its 35 years of existence. Originally designed to collect fire incident data, the current version is an "all incident" reporting system. Fire departments can report on the full range of their activities, from fire to emergency medical services (EMS) to equipment involved in the response.

Module-Based System

There are currently 11 modules in NFIRS. The Basic Module is the main module, which is completed for every incident. The other modules are filled out, when appropriate, to provide additional information on an incident. All 11 modules are listed below:

Module	Description
Basic Module	General information for each incident
Fire Module	Fire incident information
Structure Fire Module	Information on structure fires
Civilian Fire Casualty Module	Fire-related injuries or deaths to civilians
Fire Service Casualty Module	Injuries or deaths to firefighters
EMS Module	Medical incidents
Hazardous Materials Module	Hazardous materials incidents
Wildland Fire Module	Wildland or vegetation fires
Apparatus/Resources Module	Apparatus-specific information
Personnel Module	Personnel associated with apparatus
Arson Module	Intentionally-set fire information

Data from the modules are grouped together each calendar year to create the Public Data Release (PDR) files which are then released annually. The PDR files consist of a subset of the data fields contained within the NFIRS national production database. For example, data elements with sensitive or identifying information are removed as are data elements that are wholly used for maintenance or production purposes. The PDR files' data structure has been considerably simplified from the production database for ease of use. The PDR files from 2004 to the present only include fire and hazmat incidents and their related data tables. Prior to 2004, all incidents were included in the PDR files.

In its basic form, the NFIRS PDR files have a relational data structure where data from each incident module is represented by a row in a data table. The primary tables (basic incident and incident address) contain most of the Basic Module data. There is exactly one record in the basic incident table for every incident reported to NFIRS. All other modules, represented by data tables with similar names (fire incident, civilian casualties, etc.), have records that are linked to the basic incident table through unique incident identification key fields (e.g., STATE, FDID, INC_DATE, INC_NO, and EXP_NO). Some module data are split across several tables (e.g., basic incident, incident address, and basic aid tables); one table (fire incident) combines data from two modules (i.e., Fire Module and Structure Fire Module). Some tables, such as fire incident, will only have one record for each relevant incident in the basic incident table, while tables such as civilian casualty may have several records linked to a single incident in the case where multiple injuries and/or deaths occur in the same incident. The Apparatus/Resources and the Personnel Modules are not available for public release and are not represented in the PDR files.

The NFIRS PDR files contain the NFIRS 5.0 PDR data table relationship diagram which details the relationships between the data files.

NFIRS PDR Files

Currently, 19 data tables (files) in .dbf format are included in the NFIRS PDR files. The tables are generally known by their common name/description. As each table is introduced, the database filename is included in parentheses. The common names and database table file names are used interchangeably.

The table below should be used as the reference between the common names and the database table file names.

PDR Database File	Description	NFIRS Module(s)
arson.dbf	Arson incident	Arson
arsonagencyreferal.dbf	Arson agency referral	Arson
arsonjuvsub.dbf	Arson juvenile subject	Arson–Juvenile Firesetter
basicaid.dbf	Basic incident aid (given/received)	Basic
basicincident.dbf	Basic incident **(primary data file)**	Basic
civiliancasualty.dbf	Civilian casualty	Civilian Fire Casualty
codelookup.dbf	Code descriptor lookup	Reference
ems.dbf	Emergency medical service incident	EMS
fdheader.dbf	Fire department information	Reference
ffcasualty.dbf	Firefighter casualty	Fire Service Casualty
ffequipfail.dbf	Firefighter equipment failure	Fire Service Casualty
fireincident.dbf	Fire incident	Fire **and** Structure
hazchem.dbf	Hazardous material chemical involved	Hazardous Materials
hazmat.dbf	Hazardous material incident	Hazardous Materials
hazmatequipinvolved.dbf	Hazardous material equipment involved	Hazardous Materials
hazmobprop.dbf	Hazardous material mobile property type	Hazardous Materials
incidentaddress.dbf	Basic incident address	Basic
legacyfields.dbf	NFIRS 4.1 legacy field	Reference
wildlands.dbf	Wildland fire incident	Wildland Fire

The dBASE (.dbf file) format is the only format available for the PDR files.

Earlier Version Data

During the transition from the previous version, NFIRS included data collected in the previous format (NFIRS 4.1) and then converted to NFIRS Version 5.0 by the system. For many 4.1 fields and codes, there are one-to-one code conversions that did not change the nature of the original data. However, the analyst should be aware of data that cannot be converted directly, or where 4.1 data are interpreted rather than directly converted. The 4.1 to 5.0 conversion rules are documented within the *National Fire Incident Reporting System Version 5.0 Design Documentation*, (http://www.nfirs.fema.gov/documentation/design/NFIRS_Spec_2009.pdf).

As of January 1, 2009, NFIRS no longer accepts converted 4.1 data.

The USFA has recommended that where a specific research question rests on the correct interpretation of these specific codes, the analyst should restrict the analysis to NFIRS Version 5.0 data. Incident Type (INC_TYPE) 110, undefined structure fire, is a 4.1 conversion code. Incidents in the NFIRS 5.0 database with a 110 Incident Type are incidents collected under the NFIRS 4.1 system and are converted to NFIRS 5.0 compatible data. Beginning with the 2002 NFIRS data, USFA staff uses only Version 5.0 in their analyses. Therefore, Incident Type 110 is excluded. These codes are documented in the NFIRS 5.0 Design Document data dictionary section and designated there as "conversion only" codes.

The original 5.0 and converted 4.1 data could be aggregated with the caveats above and with an understanding of the code conversions for users interested in broader research inquiries.

DATA MANAGEMENT

This section presents an overview of NFIRS data import issues, use of software/database systems, and ideal software requirements.

Suggested Software/Database Systems

Database software, system, or statistical software packages for large database manipulation are required to import and use the NFIRS PDR files since the data files are extremely large and are released in dBASE format (.dbf). Some candidates for use are MySQL, Microsoft® SQL Server, Statistical Analysis Software (SAS), Statistical Package for the Social Sciences (SPSS), Microsoft® Access, and Oracle.

While current Excel or other spreadsheet programs can be used to open the data files, the use of Excel is not optimal for manipulating the data.

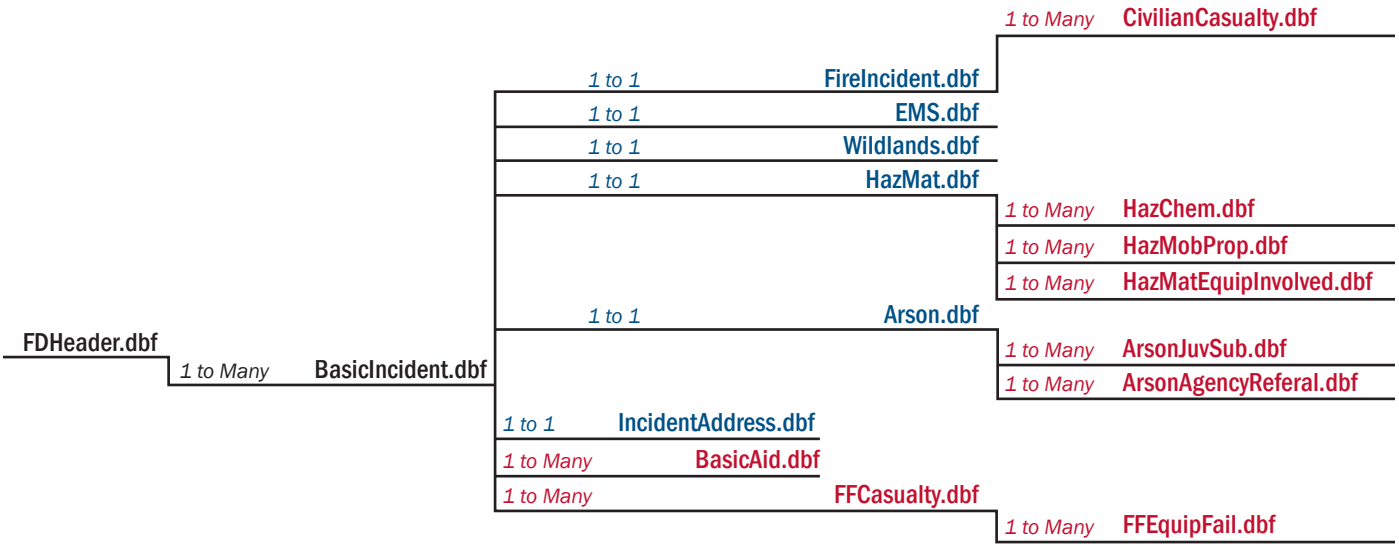
Creating Identification Keys and Setting Referential Integrity for Relational Databases

If a relational database is chosen as the preferred system, the user needs to be aware that the PDR files do not contain a preset identification (ID) key. Relational database systems use ID keys to match records from table to table. For instance, a basic incident (basicincident.dbf) record may have a related fire incident (fireincident.dbf) record and multiple civilian (civiliancasualty.dbf) or firefighter casualty (ffcasualty.dbf) records. To match all of these records together in one query, all of the tables must have ID keys set to link them together.

Unique Identifiers

Records in the PDR files have unique identifiers that follow the pattern in the NFIRS 5.0 PDR Table Relationship Diagram as follows.

NFIRS 5.0 PDR Table Relationship Diagram *8/26/2004*



The fire department header table (fdheader.dbf) unique identifier is the combination of the State and fire department ID (STATE, FDID):

Key Field	Description	Data Type	Length
STATE	Fire Dept. State	C	2
FDID	Fire Dept. ID	X	5

Source: Public Data Release Format v1_5.
Note: C = character; X = mixed character and numeric; N = numeric.

The next level of tables—basic incident (basicincident.dbf), fire incident (fireincident.dbf), emergency medical services incident (EMS.dbf), wildlands (wildlands.dbf), hazmat (hazmat.dbf), arson (arson.dbf), and incident address (incidentaddress.dbf)—all share the same unique identifier format. These tables have a one-to-many relationship with the fdheader table. The unique identifier for these incident-associated records is the combination of the State, fire department ID, incident date, incident number, and exposure number (STATE, FDID, INC_DATE, INC_NO, and EXP_NO). This combination of fields ensures that every incident has a unique reference regardless of differences in recordkeeping between fire departments across the country. For example, the basic aid (basicaid.dbf), hazmat mobile property (hazmobprop.dbf), and hazmat equipment involved (hazmatequipinvolved.dbf) tables also share this key, but it is not a unique key.

The ID key is used to join different tables in the database together. In some tables, there is a one-to-one match. In others, there is a one-to-many match. For these tables (one-to-many), there are additional sequence fields that need to be included as part of the ID key as shown below.

Key Field	Description	Data Type	Length
STATE	Fire Dept. State	C	2
FDID	Fire Dept. ID	X	5
INC_DATE	Incident Date	N	8 (MMDDYYYY)
INC_NO	Incident Number	X	7
EXP_NO	Exposure Number	N	3

Source: Public Data Release Format v1_5.
Note: C = character; X = mixed character and numeric; N = numeric.

The following tables require an additional field(s) to create a unique identifier:

Table	Additional Key Field	Data Type	Length
civiliancasualty.dbf	SEQ_NUMBER	N	3
hazchem.dbf	SEQ_NUMBER	N	3
ems.dbf	PATIENT_NO	N	3
arsonjuvsub.dbf	SUB_SEQ_NO	N	3
arsonagencyreferal.dbf	AGENCY_NAM	X	30
firefightercasualty.dbf	FF_SEQ_NO	N	3
ffequipfail.dbf	CAS_SEQ_NO	N	3
	EQP_SEQ_NO	N	3

Source: Public Data Release Format v1_5.
Note: C = character; X = mixed character and numeric; N = numeric.

The key fields are also identified in the NFIRS Public Data Release Format (Version 1.5) that accompanies the PDR files. This format is also included as *Appendix C*.

Issues

Referential Integrity

Data cannot be imported directly into an existing NFIRS relational database with established referential integrity because the NFIRS .dbf data tables do not contain ID keys. A relational database with referential integrity requires that the primary table, basic incident, contain unique ID keys and all records in related tables (e.g., fire, casualties) have ID keys that exactly match one record in the basic incident table. USFA does not currently have a QA process to check for inconsistencies in the key fields in the NFIRS basic incident table or in related tables.[1] Therefore, if the data are to be imported into a database, it is suggested to import the data into a secondary or test database to create and confirm the uniqueness of the keys and resolve any duplicate or mismatched ID keys. A case sensitive collating sequence must be used as upper and lower case letters can appear in the incident number field. Once the ID keys are established and verified, the tables can then be imported or copied into the primary database without causing referential integrity errors.

Setting referential integrity is not required to create the database or to do analysis of the NFIRS data. However, without it, analysts will need to conduct a QA check of the data for mismatched records. Referential integrity is therefore a useful step in ensuring the quality of the data. Most database systems have tools for setting referential integrity between tables, often using a graphic interface to visually depict the database model.

If other packages (e.g., SAS) are chosen, this step may not be necessary.

Numeric Data Conversion

Data conversion from numeric to date-time data may be necessary for the various date-time data elements. Automatic conversion of numeric data to a text field may convert the data to an integer type, which will truncate the leading zero and additional data massaging may be necessary.[2]

1 Depending on the database system, these records may need to be removed or the entire import process may fail.
2 For example, an alarm on 01/01/03 at 13:15 (1:15 p.m.) would be formatted as "010120031315" in a text field. Converting this date-time data to an integer type would truncate the leading zero to produce the number 10,120,031,315.

Depending on the database environment, other numeric elements may need to be reviewed for appropriate data type matches.

Care needs to be taken to ensure the proper importation of fields with null (blank) values. Null values exist in NFIRS and are *not* equivalent to zero. Some database products will automatically convert null values to zeros if care is not taken on the import of data. This will be disastrous for the dollar-loss fields and any other numeric field where a null value represents "unreported" and a zero means "there were none."

DATA QUALITY

The USFA does not currently have a QA system in place to check for codes that are not in the current data dictionary. The NFIRS PDR database, as a result, contains invalid codes and may exhibit data inconsistencies that violate published documentation.

The code lookup table (codelookup.dbf), which is based on the data dictionary (http://www.nfirs.fema.gov/jsps/nfirsdownload.jsp?url=/documentation/design/NFIRS_Spec_Tables_2009.xls) can be used to validate data codes. Some codes are added over time, so it is important to use the most recent code lookup table.

Note that hierarchical code placeholders are used for the numeric code values in the data dictionary and in the code lookup table. These placeholders are not themselves valid codes used for data entry. Instead, they are used as section titles for code groups and are intended for use in automated pick-lists and database groupings used by data analysts. They should never be allowed as valid code choices for data entry and should be rejected as invalid by the NFIRS 5.0 edits. Some examples of code placeholders are "1 Fire" and "10 Fire, other" in the Incident Type (INC_TYPE) field. These placeholders, however, are not noted in either the data dictionary or the code lookup table. When in question, refer to the *National Fire Incident Reporting System 5.0 Complete Reference Guide* (CRG) (http://www.nfirs.fema.gov/documentation/reference/). If the code in question is not in the CRG, it is not valid.

Null Values in Required Fields

There remain instances of null values in required fields. As NFIRS 5.0 matures, more and more of these issues surface and are corrected. Nonetheless, analysts should be aware that null values may occur in required fields and that a work-around will be necessary. Heat source and structure type are examples where null values have been an issue. In the case of heat source, null values typically occur in fire incidents where the Fire Module, that is, detailed fire-related data, is not required (confined fires and outside rubbish fires) and in vegetation, special outside fires, and crop fires where the Wildland Fire Module can be submitted (and heat source is not required). In the case of structure type, null values typically occur in fire incidents where the Fire Module is not required (confined fires).

If null values are found in a required field in the 5.0 data, notify the USFA NFIRS manager of the issue and the specific query or section of a program that was used to find the error or the specific record (noting the ID key fields) that contains the error.

Factor Fields

Several data items allow multiple entries, such as "factors contributing to ignition" and "human factors contributing to ignition." In these cases, each entry is distinct. That is, for example, FACT_IGN_1 <> FACT_IGN_2, where '<>' means not equal. There have been instances when this rule has not been applied correctly or the edit check to catch the error has not worked properly. Again, if errors are found, *notify the USFA NFIRS manager of the issue and the specific query that was used to find the error or the specific record (noting the ID key fields) that contains the error.*

When analyzing the frequency of these factors, the convention established has been to include all factors mentioned in the data in the frequency distribution. That means the total number of factors (the denominator) may exceed the number of incidents (or casualties, depending on the factor series under analysis).

The analyst has several choices for techniques:

- Query the data for the distribution of each subfactor variable where the factor is specified. For the example above, this constraint is where FACT_IGN_X is between 00 and 75 and ensuring no duplicates exist between the factors in an incident. Then, add the results of the queries together. The results from each query are appended in an Excel spreadsheet, sorted by the FACT_IGN_X column and subtotaled for each factor value. Because the total number of factors may exceed the number of incidents, the percentage distribution for the sum of the factors will exceed 100 percent. Percentages can then be derived using the sum of the first factor as the denominator. (Other methods can be used to achieve the same result.)
- Write code to capture and count each occurrence of the factor code across the variable.
- Manipulate the input data to create a new data table, file, data vector, or other schema that collapses the multiple fields. Perform the analysis on this user-created schema.

This topic is addressed further in a later section, *Analysis of Common Data Elements*, that addresses specific data (i.e., *Multiple Entry Data Elements*) elements and how USFA analyzes and interprets the results of the analyses.

Identifying Large Outliers

If the record clearly contains bad data, use a unique value (such as the ID key) to exclude the record from the query. Before excluding such records, however, it is suggested that a quick search be conducted to see if some unusual fire did occur. Searching a reputable Internet search engine by the date, State, and the word "fire" will usually produce a news account if a large fire did, in fact, occur.

NFIRS 5.0 ANALYSIS CONSTRAINTS AND CONSIDERATIONS

The following sections discuss constraints and issues related to querying and analyzing NFIRS 5.0 data.

Mutual Aid

Some records in NFIRS refer to aid provided to another fire department, either mutual aid given to an outside fire service entity upon request of the outside entity (AID = 3) or automatic aid given through mutual-aid agreements (AID = 4). To isolate individual fire incidents, only records of the primary fire department are included. This is achieved by excluding records reflecting aid provided, i.e., excluding records with AID = '3' or '4.' In essence, *not* excluding aid incidents when analyzing incidents will result in the *double counting* of those incidents where both the giving and receiving departments report to NFIRS.

Mutual-aid given incidents (AID = 3 or 4) should always be excluded from all queries with one major exception: when counting firefighter casualties. Fire departments report only their own firefighter casualties and not those of a mutual-aid department. Thus, to capture all firefighter injuries, both the incident where the department received aid and the incident where the department provided aid must be included.

To reiterate, if counting fire service casualties, include aid-given incidents since each fire department (regardless of giving or receiving aid) responding to an incident reports its own firefighter casualties; for everything else, exclude them.

Other aid-given (AID = 5) incidents should always be included in all analyses. This code is for incidents where the aid-giving department is responding to an area that has no fire department of its own (for example, west Texas). The giving department completes the entire incident report just as if it had occurred in its own jurisdiction. That incident report is the one and only copy of the incident reported in NFIRS since there is no aid-receiving department. For that reason, other aid-given (AID = 5) incidents must always be included in queries. Only mutual aid-given (AID = 3 or 4) incidents must be excluded (again, except when counting firefighter casualties).

Casualty Considerations

Civilian Casualties

Civilian casualties (i.e., injuries and deaths) are tallied in the basic incident table and the details of each casualty are reported in the civilian fire casualty table. To indicate the type and level of the casualty, a 6-level severity scale (SEV) is used. While civilian injuries have severity values of 1-4, undetermined (U) entries in severity are also included in the analysis of civilian injuries. Null entries in severity are excluded in analyses of civilian fire injuries as SEV is a required field. Civilian deaths are noted as SEV = 5. The civilian casualty severity codes are shown below:

Severity Scale	Definition
1	Minor
2	Moderate
3	Severe
4	Life Threatening
5	Death
U	Undetermined

While the CRG instructs a department completing the Basic Module to include only civilian casualties that are fire-related, there is a potential issue with counting EMS casualties as civilian fire casualties (see "EMS Casualties Occurring at Fire Incidents"). There are two methods that can be used to derive the number of actual civilian fire-related casualties:

- Where the incident type is "fire" (i.e., INC_TYPE in the 100 series), the civilian death (OTH_DEATH) and injury (OTH_INJ) fields from the basic incident table can be summed, or
- The number of civilian fire casualty records for each incident can be totaled from the civilian casualty table.

Each of these methods has drawbacks. The first method is the most straightforward, but there is a chance that the fire incident may also have nonfire-related EMS casualties which are also included in the total—most likely a small number, especially since the NFIRS training at the National Fire Academy (NFA) and the National Fire Information Council (NFIC) reinforces the CRG directions by instructing firefighters and other personnel to record only civilian fire casualties on the Basic Module Form. To ensure that only fire-related casualties are included, only fire incidents (i.e., INC_TYPE in the 100 series) are considered.

The second method ensures that only true civilian fire casualties are included in the total but may exclude some fire casualties because the casualty was reported in the Basic Module but no matching Civilian Fire Casualty Module entry was completed. NFIRS does not require a Civilian Fire Casualty Module to be completed for each casualty reported on the Basic Module because it may be EMS-related, not fire. Analysts have a choice between a number that may be slightly high but includes all civilian fire casualties, or a number that may be low because not all casualties reported on the Basic Module have a matching civilian fire casualty record.

Firefighter Casualties

As a reminder, unlike civilian casualties and fire counts, mutual aid-given incidents must be included when using the basic incident table to identify fire service casualties. See the section above on *Mutual Aid*.

Fire service casualties are tallied in the Basic Module and the details of each casualty are reported in the Fire Service Casualty Module (regardless of incident type). The SEVERITY field (1-7) is used to indicate the type and level of the casualty. Fire service deaths in the firefighter casualty file are those with SEVERITY = 7.

NFIRS 5.0 fire service incidents with SEVERITY = 1 are not casualties. This code indicates a report that the firefighter has been exposed to something that might be harmful to his health at some point in the future (asbestos, for example). As such, SEVERITY = 1 records are only intended for local fire department documentation of such exposures and are not included as firefighter injuries in data analyses at the national level.

All other SEVERITY entries are considered injuries with the follow exception:

> Prior to 2005 NFIRS data, firefighter injuries with null SEVERITY values are included as injuries. Starting with 2005, firefighter injuries with null severity values are *excluded* in the injury analyses. SEVERITY became a required field as of 2005; null values are considered to be invalid entries.

Reported firefighter deaths in NFIRS are fairly rare compared to reported injuries. The valid firefighter casualty severity codes are shown below:

Severity Scale	Definition
1	Report only, including exposure
2	First aid only, no lost time
3	Treated by physician, no lost time
4	Moderate severity, lost-time injury
5	Severe, lost-time injury
6	Life threatening, lost-time injury
7	Death

EMS Casualties Occurring at Fire Incidents

As NFIRS 5.0 does not have EMS-specific casualty fields on the Basic Module, it is possible that the civilian casualty counts and fire casualty counts include some EMS casualties, even when the incident type is 'fire.' This is only possible when a fire incident also includes EMS casualties. This is thought to be a rare event.

Since some EMS fatalities may be included in the Basic Module counts in NFIRS 5.0, there may not be one-to-one comparisons with the counts in the Basic Module and the number of records in the civilian fire casualty table or the fire service casualty table. However, there cannot be more injuries or more deaths in the casualty modules than the counts in the Basic Module.

Therefore, the counts on the Basic Module may be high due to the inclusion of EMS casualties in the casualty counts and the number of casualty table records (both in the civilian and firefighter casualty tables) may be less because its completion is no longer enforced.

USFA recommends the use of the basic incident table casualty counts for the following reasons:

1. The NFIRS training classes teach departments only to report fire casualties on the Basic Module, so theoretically, most will be doing it correctly.

2. The cases where fire and EMS casualties coexist should be fairly rare.
3. It is less likely that the casualty module will be completed and that may represent a substantial undercount.

Confined Fires

Confined fires (Incident Type, INC_TYPE, codes 113–118) do not require a Fire Module and often have no civilian casualty modules. This results in an increase in the proportion of unknown values when distributing queries by fire incident or civilian casualty fields (see the later section *Null, Blank, and Unknown Entries*). There are two options that could be pursued to ensure that the confined fire null values do not have an undue influence on the unknown values:

- Limit the analysis to nonconfined fires or to only fires that have a Fire Module (some confined fires do have fire incident records).
- Separate the analyses into a confined fires version and a nonconfined fires version. The resulting analysis will be very generic but there are instances where this is reasonable.

USFA generally uses the second option. The exception is when the number of confined fires is very small and the inclusion or exclusion of them does not significantly change the analysis. In this case, the analysis may or may not include the confined fires, depending on the judgment of the analyst.

Note that while the NFPA survey includes a category for confined fires, NFPA does not publish estimates of confined fires. It is unclear what the effect of this has on estimates derived from NFIRS datasets that include confined fires. An example of one such estimate would be on the number of fires with smoke alarms present, but not working. The Basic Module gives some information on smoke alarm presence and operation, but not complete information. The Fire Module gives additional information such as operational status, effectiveness, power supply, type of alarm, and detector failure reason.

Counting Fires Versus Counting Fire-Related Statistics

When the variable in question is a fire-related variable (i.e., captured under the fire modules—fire, structure fire, wildland, etc.), fires are counted. When the variable in question is in the casualty modules, casualties are counted. Even the most seasoned fire data analyst may overlook this distinction from time to time. The proper phrasing/analysis for casualties counted from fire variables is "fires with casualties/injuries/deaths" or an equivalent statement.

An example of this is when looking at fatal fires (those fires that result in fatalities) and the fatalities themselves. These two types of analyses are very different. Fatal fires investigate the fire-related variables to analyze information about the *fires* that resulted in fatalities. The variables used in the analyses are from the Fire Module. Whereas when analyzing fatalities, the casualties are examined, not the fire. The variables in question are contained in the casualty modules. As there is a one-to-many relationship between fires and casualties, the distinction between the analysis of the fire and the analysis of the result of the fire is an important one.

In this vein, analyses such as fires with deaths/injuries, fires causing/resulting in deaths/injuries, and the like focus on the fire. Analyses such as "fatalities" and "injuries" focus on the casualty.

Fires with loss—property and contents—can also be analyzed separately from fires with no loss reported. Loss is often difficult to quantify at the incident scene. Often, it may be estimated or not reported at all. As a loss report is not required for all fires, there is some debate whether the appropriate analysis is to treat loss across all fires, only for those fires where loss is specified, or to derive an average loss and apply it to fires with no loss reported. The latter analysis assumes that, except in the instances of trash fires that do not burn items of value

(including the trash container) and some outdoor vegetation fires, any fire exacts some monetary toll associated with what was lost.

As noted earlier, null values must be carefully imported. As well, analysts need to be aware of their system use of null values as some systems may produce unusual results when null values are added to numeric values. As well, there is an issue with the reporting of extremely small losses under the assumption that a value has to be reported for every fire. In short, dollar-loss analyses must be treated with extreme caution.

For instance, in 2008, a total of 368,232 fires were reported on residential properties. The total loss across these properties was reported as $4,654,041,727 (property and contents). Not all of the fires reported loss; this loss was reported from 126,001 of the fires. While the average loss reported across all residential property fires is $12,639, the average loss for the fires that reported a loss is $36,937—a substantial difference. *Loss is considered to be one of the less reliable data elements in NFIRS, as it is difficult to establish dollar loss without sufficient information or records.*

Trends and Multiyear Analyses

It is important to note that NFIRS data may fluctuate from year to year, resulting in variability. It is possible that any given year may be an anomalous year for a subset of fire data or for the data overall. Statistically rare, but real-world incidents do occur. Large conflagrations such as the various California wildfires, large petrochemical plant fires such as the 1989 Houston Ship Channel fire, and large multifatality, multiinjury fires such as the 1980 MGM Grand Hotel fire or the 2003 fire at The Station Nightclub can have one-time effects on fire analyses for that year.

For these reasons—yearly fluctuation and single-event spikes—it is often preferable to aggregate several years' data for analyses. USFA uses 3-year averaged data and, where possible, analyzes trends of 5 or more years' data. Trends are usually described by the change in the linear best fit. Moving averages are another avenue of trend analyses available.

National Estimates

National estimates are estimates of the numbers of fire losses (fires, deaths, injuries, dollar loss) associated with a subset of the fire data. They are not the raw totals from NFIRS. These estimates are based on a method of apportioning the NFPA estimates for total fires and for vehicle, outside, and other fires. Generally speaking, national estimates are derived by computing a percentage of fires, deaths, injuries, or dollar loss in a particular NFIRS category and multiplying it by the corresponding total estimate from the NFPA annual survey. This methodology is the accepted practice of national fire data analysts. The specifics of the methodology are not discussed here but the methodology may be downloaded from the following NFPA webpage: http://www.nfpa.org/assets/files/PDF/Research/Nationalestimates.pdf.

ANALYSIS OF NFIRS 5.0 DATA

The following section lists the parameters of common fire analyses. Each type of analysis typically involves multiple fields and often multiple tables. The values to search for in each field are listed individually, as a range of inclusive values (e.g., "100–199"), or in some cases a mix of individual values and ranges, separated by commas (e.g., "100, 140–199," meaning the individual value 100 and the inclusive range of 140–199). In some cases, an analysis will look at most of the data in a given field, with the exception of a specific value or a small range of values. For example, when analyzing nonresidential properties, it is easier to simply exclude the residential range rather than trying to define everything else. In these examples, the excluded range will be prefaced with "not" (e.g., "NOT 400–499, exclude NULL"), meaning all values except the inclusive range of 400–499 and nulls. Null values are often treated separately as noted in each section.

Statistical Considerations for NFIRS Data

Any analysis of the NFIRS data should note that NFIRS is neither a random sample nor a census of fire incidents or casualties in the United States. As such, the analyst may not accurately make estimates of total fires, fire losses, or fire casualties in the United States from NFIRS data alone. Similarly, statistical means (averages) or standard error measurements taken from NFIRS describe the population of fire incidents related to fire departments that participate in NFIRS, but do not describe the population of fire incidents in the Nation as a whole.

However, the proportion of fire incidents reported to NFIRS is large enough that reasonable inferences can be made that the proportions of fires in NFIRS are similar to the true national measurements.

Null, Blank, and Unknown Entries

On a fraction of the incident reports or casualty reports sent to NFIRS, the desired information for many data items either is not reported or is reported as "unknown." For most coded fields, 'U,' 'UU,' and 'UUU' are codes available in NFIRS 5.0 to indicate "unknown." The total number of null, blank, or unknown entries can be larger than some of the important subcategories. The lack of data masks the true picture of the fire problem. In some cases, even after the best attempts by fire investigators, the information is truly unknown. In other cases, the information reported as unknown in the initial NFIRS report is not updated after the fire investigation is completed. When the unknowns are large, the credibility of the data suffers.

In the standard analysis of NFIRS data, the approach taken is to compute two distributions: one that includes all entries ("raw" distribution) and one that includes only those entries for which data were provided ("known" distribution). This latter calculation, in effect, distributes the fires for which the data are unknown in the same proportion as the fires for which the data are known, which may or may not be approximately right.

Null and blank values differ from the variously coded 'U' entries in several ways and, depending on the database system used, the accounting of null and blank values may need to be taken into consideration as noted.

It is important to note that null and blank values are considered *unreported* data and differ in meaning and substance from "unknown" data. In data elements where information is required, a null or blank value may invalidate the record.

Evaluating Fields with NULL Values

In the Microsoft® SQL Server environment, a field must have a value to be evaluated in a query expression. Other platforms may not impose this requirement. This need becomes an issue when the analyst needs to exclude a range of values from a query. For instance, if one is counting nonresidential incidents and wishes to exclude the property use range 400–499, then an additional condition needs to be included (when using 2006 to present NFIRS data) to also remove null values.

Fire Runs

The following parameters provide the total number of NFIRS 5.0 fire runs in the database:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	INC_TYPE	Type of incident	100–109, 111–199

Note that mutual-aid incidents are counted as fire runs.

Total Fires

Fires are designated by the 100 series Incident Type. Note again that incident type 110 is not a Version 5.0 incident type (INC_TYPE). The following parameters provide the total number of NFIRS 5.0 fires in the database:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	100–109, 111–199

Mutual-aid runs are eliminated to avoid double counting of fire incidents.

Types of Fires by Incident Type

The general categories of fire incidents are broadly defined by the type of incident. The table that follows shows the current designation of general fire incident categories. Parameters specific to each fire incident category (structure, vehicle, outside, and other) are discussed separately in later sections. Fires with undesignated incident type (INC_TYPE) codes are included in "other" fires.

Note that Incident Type 110 is not included in the following table as it is not a Version 5.0 incident.

Building fires, a subset of structure fires, are discussed in the section *Building Fires*.

Incident Type	Incident Type Code
Structure Fires	111–123
Confined Fires	113–118
Mobile Structure Fires	120–123
Mobile Property/Vehicle Fires	130–139 (with mobile property involved (MOB_INVOL) of 1, 3)
Outside Fires	140–179 less 163
Natural Vegetation Fires	140–149
Outside Rubbish Fires	150–159
Special Outside Fires	160–169 less 163
Cultivated Vegetation Fires	170–179
Other Fire	100–109, 130–139 (MOB_INVOL not 1, 3), 163, 180–189, 190–199
Other Fires	100
Undesignated	101–109
Vehicle-Related Fires Where Vehicle Itself Did Not Burn	130–139 (MOB_INVOL is NULL or is not 1, 3)
Outside Gas or Vapor Combustion Explosion Without Sustained Fire	163
Undesignated	180–189
Undesignated	190–199

Structure Fires

NFIRS 5.0 has an inclusive definition of structure. A structure is a built object and can be a bridge, tower, tunnel, fence, telephone pole, building, or some other built object. Incidents related to structure fires have Incident Types in the range 111–123. The overall structure fires group includes both fixed structures (111–118) and mobile properties used as fixed structures (120–123).

Note that this category also includes confined fires (INC_TYPE 113–118), which may not always occur in a structure or building. The following parameters provide the total number of NFIRS 5.0 structure fires:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111–123

When analyzing structure fires, it is necessary to examine what is meant by structure. If the analysis is actually based on "buildings," then the structure-type variable needs to be considered in addition to the structure fire incident types above. The analysis of buildings is discussed in a later section on *Building Fires*.

Confined Structure Fires[3]

NFIRS-defined confined structure fires are those fires that did not spread beyond the container of origin (e.g., a cooking pan fire that is put out on the stove) and are in the Incident Type (INC_TYPE) range 113–118. Confined fires rarely result in serious injury or large content losses and are expected to have no significant accompanying property losses due to flame damage. NFIRS allows abbreviated reporting for confined structure fires (as well as some types of confined outdoor fires) and many reporting details of these fires are not required, nor are they reported (not all fires confined to the object of origin are counted as confined fires). The following parameters provide the number of NFIRS 5.0 confined structure fires:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	113–118

NFIRS 5.0 is designed to encourage the reporting of small fires, such as those confined to a stove top or a trash can. However, it appears that fires with these codes may not be exclusively structure fires nor exclusively confined to object of origin fires. Although they are included in the structure fire range of 111–123, confined fires may or may not occur in a structure, e.g., confined cooking fires may occur on an outdoor patio.

There are analytic considerations associated with confined fires. These considerations are discussed in the section *Building Fires*.

Nonconfined Structure Fires

Nonconfined structure fires are those incidents typically associated with larger, more serious fires that progress beyond control and often result in substantial loss and/or casualties. The following parameters provide the number of NFIRS 5.0 nonconfined structure fires:

[3] See also USFA's report on *Confined Structure Fires*, February 2006.

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111, 112, 120–123

Vehicle Fires/Mobile Properties

Vehicle fire incidents (also known as Mobile Property fires) are generally coded with an Incident Type (INC_TYPE) in the 130 series. Additional criteria must be included to separate those incidents where the vehicle was involved in ignition, but did not itself burn (MOB_INVOL = 2) as well as those incidents, coded as a vehicular fire, but do not indicate that mobile property was involved (MOB_INVOL = N). This latter category is unusual and likely an error. These are fires, but the incident type is most likely miscoded as vehicle fire incidents. The following parameters provide the total number of NFIRS 5.0 vehicle fires:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	130–139
Basic Incident	MOB_INVOL	Mobile property involved	1, 3

Outdoor Fires

Outdoor fire incidents are generally coded in the INC_TYPE 140–170 ranges. The exception is INC_TYPE 163, "outside gas or vapor combustion explosion without sustained fire," which is considered an "other" fire. The following parameters provide the total number of outdoor fires in the NFIRS database:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	140–179, less 163

For purposes of analysis, Incident Types (INC_TYPE) 154 (dumpster or other outside trash receptacle fire) and 155 (outside stationary compactor or compacted trash fire) are considered as "confined" fires. In addition, Incident Types in the 150 series are not required to complete the Fire Module.

Other Fires

"Other" fire incidents are those miscellaneous fires that do not neatly fit into the major categories. The parameters are detailed in Appendix B, *General Incident Grouping by Incident Type and Property Use* and the above section, *Types of Fires by Incident Type*. The following parameters provide the total number of other fires in the NFIRS database:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	100–109, 163, 180–189, 190–199
Basic Incident AND Fire Incident	INC_TYPE MOB_INVOL	Type of incident Mobile property involved	130–139 NOT 1, 3

Building Fires

By and large, most of the structure fire incidents occur in buildings. Analysis of purely building variables, such as sprinklers or smoke alarms, however, require that only Structure Types 1 (enclosed building) or 2 (fixed portable or mobile structure) be considered. This is not only for analytic sense but also to preclude unnecessary null values. That is, only those structure fires that are buildings (Structure Type is a 1 or a 2) are required to provide data on:

- building status;
- building height;
- main floor size;
- fire origin;
- fire spread;
- presence of detectors (smoke alarms); and
- presence of automatic extinguishing systems.

Analyses on any of these variables that do not restrict the structure type appropriately are not valid. These same considerations apply to residential and nonresidential buildings below.

The one caveat is that confined structure fire incidents that do not have a structure type specified (STRUC_TYPE is null) are presumed to occur in buildings. These incidents, however, are not included in the analyses of the above named variables.

The following parameters provide the total number of NFIRS 5.0 building fires. Note that this category also includes confined fires (INC_TYPE 113–118), which *may* not always occur in a building. Also note that different structure type parameters apply to confined and nonconfined fire incidents:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident (nonconfined fires) Type of Structure	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on) 1, 2
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident (confined fires) Type of Structure	113–118 1, 2, or NULL

In previous versions of NFIRS, the term "structure" commonly referred to buildings where people live and work. To coincide with this concept, the definition of a building fire for NFIRS 5.0 has, therefore, changed to include only those fires where the NFIRS 5.0 Structure Type is 1 or 2 (enclosed building and fixed portable or mobile structure). Such fires are referred to as "buildings" to distinguish these buildings from other structures that may include fences, sheds, and other uninhabitable structures. **In addition, confined fire incidents that do not have a structure type specified (STRUC_TYPE is null) are presumed to occur in buildings.** Nonconfined fire incidents without a structure type specified are considered to be invalid incidents (structure type is a required field) and are not included in analyses of building fires. See the next sections on *Confined Building Fires* and *Nonconfined Building Fires*.

Starting with 2008 NFIRS data, the definition of Incident Type 112 was enforced. Early analyses of Incident Type 112 (fire in structure, other than in a building) indicated that these incidents were often miscoded and were intended to be building fires. As a result, prior to 2008, Incident Type (INC_TYPE) 112 is included as a building fire; from 2008 on, it is excluded.

Confined Building Fires

The following parameters provide the number of NFIRS 5.0 confined building fires:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident Type of Structure	113–118 1, 2, or NULL

Nonconfined Building Fires

The following parameters provide the number of NFIRS 5.0 nonconfined building fires:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident Type of Structure	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on) 1, 2

Below is an example of a distribution of confined and nonconfined building fires.

Residential Building Smoking-Related Fires by Type of Incident (2006–2008)

Incident Type	Percent
Nonconfined fires	94.2
Confined fires	5.8
Trash or rubbish fire, contained	5.4
Cooking fire, confined to container	0.2
Commercial compactor fire, confined to rubbish	0.1
Total	100.0

Source: NFIRS 5.0.
Note: It is rare that confined smoking-related fires are associated with cooking and heating. Ninety-three percent of the confined smoking-related fires are from fires in trash or garbage bins.

Type of Fire by Property Use

The general categories of property use are shown in the following table. Residential properties are defined by including only the 400 series. Nonresidential, or more properly "not residential," properties are defined by **excluding** the 400 series. This exclusion generally means that unknown or blank entries in property use will automatically be considered nonresidential. Property use is a required field; blank and null values are not expected (but do occur). Null values in property use receive special treatment as the requirements for certain types of incidents changed in 2006 and the specifications are discussed in a later section, *Nonresidential Fires*.

Property Use	Property Use Code
Assembly	100 series (if Eating/Drinking separate, less 160 series)
Eating, drinking places	160 series
Educational	200 series
Health care, detention, and correction	300 series
Residential	400 series
1 or 2 family dwelling	419
Multifamily dwelling	429
Other residential	400, 439, 449, 459, 460, 462, 464 or 400, 439–499
Mercantile, business	500 series
Industrial, utility, defense, agriculture, mining	600 series
Manufacturing, processing	700 series
Storage	800 series (if Residential Garage separate, less 881)
Detached residential garage	881
Outside or special property	900 series
Property use, other	000–009
None	NNN
Undetermined	UUU

Property Use Issues

Prior to January 2006, PROP_USE was not required when AID was 3, 4, or 5. Since then, PROP_USE is required for AID = 5.[4]

The mixed use property variable, while available, has not been used by USFA in analyses to date. It is anticipated that analytic issues may be encountered with this data element.

Residential Fires

All incidents that relate to property used for residential purposes will have a property use (PROP_USE) code in the 400–499 range. The following parameters provide the total number of residential property fires in the NFIRS database by including the residential property use range:

[4] As an aside, for analysts who include the NFIRS 4.1 converted data, the 4.1 conversion to 5.0 may have yielded null or blank values in PROP_USE when 4.1 was blank or coded as "???".

Residential Property Fires

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	100–109, 111–199
Basic Incident	PROP_USE	Property use	400–499

Residential Structure Fires

The following parameters provide the total number of NFIRS 5.0 residential structure fires in the database by including the property use range of residential properties:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111–123
Basic Incident	PROP_USE	Property use	400–499

Residential Building Fires

The following parameters provide the total number of NFIRS 5.0 residential building fires in the database by including the property use range of residential properties and enclosed structures:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident Type of structure (enclosed ....)	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on) 1, 2
Basic Incident AND Fire Incident	INC_TYPE STRUC_TYPE	Type of incident Type of structure (enclosed ....)	113–118 1, 2, or NULL
Basic Incident	PROP_USE	Property use	400–499

Nonresidential Fires

All incidents that relate to property used for other than residential purposes—'nonresidential' properties—are specified by excluding the residential property use codes (PROP_USE) in the 400 to 499 range. Null values in property use are included or excluded according to the following rubric:

> Prior to 2006, if PROP_USE is NULL and not (400-499), then the incident is "not residential;" from 2006 on, incidents with NULL property use are excluded.

The following parameters provide the total number of nonresidential fires in the NFIRS database by *excluding* the property use range of residential properties:

Nonresidential Property Fires

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	100–109, 111–199
Basic Incident	PROP_USE	Property use	NOT 400–499 or is NULL (pre-2006) NOT 400–499 or NOT NULL (from 2006 on)

Nonresidential Structure Fires

The following parameters provide the total number of NFIRS 5.0 nonresidential structure fires in the database by *excluding* the property use range of residential properties:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111–123
Basic Incident	PROP_USE	Property use	NOT 400–499 or is NULL (pre-2006) NOT 400–499 or NOT NULL (from 2006 on)

Nonresidential Building Fires

The following parameters provide the total number of NFIRS 5.0 nonresidential building fires in the NFIRS database by *excluding* the property use range of residential properties and including only enclosed structures:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on)
AND Fire Incident	STRUC_TYPE	Type of structure (enclosed ....)	1, 2
Basic Incident	INC_TYPE	Type of incident	113–118
AND Fire Incident	STRUC_TYPE	Type of structure (enclosed ....)	1, 2, or NULL
Basic Incident	PROP_USE	Property use	NOT 400–499 or is NULL (pre-2006) NOT 400–499 or NOT NULL (from 2006 on)

Other Property Definitions

Manufactured Homes

Mobile structures, referred to as Manufactured Homes, are defined as Incident Types between 120 and 123 and property use in the 400 series. This definition may be overly inclusive (see table below) but analyses of the NFIRS data reveal that many incidents having 120, 122, and 123 Incident Types (INC_TYPE) were coded as residential properties, implying that the incidents were mobile homes.

Mobile Structure Incident Type	Description
120	Fire in mobile property used as a fixed structure, other
121	Fire in mobile home used as fixed residence
122	Fire in motor home, camper, recreational vehicle
123	Fire in portable building, fixed location

In NFIRS, manufactured homes are defined as mobile homes used as fixed residences. Manufactured homes are typically residential trailers, although the distinction between residential trailers and other prefabricated homes is not as clear as in previous NFIRS versions. In most queries, structures are broadly defined as INC_TYPE 111–123, which include a wide range of buildings and mobile structures, including parked trailers and recreational vehicles. A more strict definition is required to focus on those mobile residential structures that closely approximate manufactured homes.

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	120–123
Basic Incident	PROP_USE	Property use	400–499
Fire Incident	STRUC_TYPE	Type of structure (enclosed only)	1, 2

Vacant/Under Construction Buildings, Nonconfined Fires

Vacant/under construction buildings can be involved in any type of nonconfined fire incident and are defined by the building status field located on the Structure Fire Module. The key criteria are to include STRUC_STAT = 1 or 4–7, which are vacant or under construction codes. The overall parameters that are used to analyze vacant or under construction properties are below. Residential or nonresidential property use can also be specified (not shown below).

Note that vacant/under construction buildings are analyzed for nonconfined fires only because the building status is not a required field for confined fires.

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on)
Fire Incident	STRUC_TYPE	Type of structure (enclosed only)	1, 2
Fire Incident	STRUC_STAT	Building status	1 or 4–7

Occupied Buildings, Nonconfined Fires

Building status is also used in analyses of alerting systems (typically smoke alarms) and less often in the analyses of suppression systems (sprinklers). For analyses of alarm effectiveness, one of the key issues is whether the alarm was effective at alerting the occupants. This analyses is done for occupied buildings only (STRUC_STAT = 2). Analyses have demonstrated that "not actively occupied housing" (vacant or under construction) typically do not include sufficient data in the smoke alarm variables; by only analyzing occupied buildings—where alarm systems are designed to alert occupants—undetermined and null entries are reduced. The overall pa-

rameters that are used to analyze nonconfined fires in occupied buildings are below. Residential or nonresidential property use can also be specified (not shown below). However, there are some exceptions to analyzing smoke alarm data for nonconfined fires in occupied buildings only for certain property types (e.g., multifamily buildings and university housing). For these residential property types, smoke alarm analyses should include both *occupied* and *unoccupied* buildings because of alarm placement, possible interconnection of alarms in new construction, stricter building codes, and the proximity or closeness of the dwelling units/living quarters that may allow occupants to hear an alarm, smell smoke, or see flames coming from a neighboring unit. Even though a fire may start in an unoccupied unit, it is possible that a fire department will be notified either automatically or by an occupant in a neighboring unit.

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Basic Incident	INC_TYPE	Type of incident	111, 112, 120–123 (pre-2008) 111, 120–123 (from 2008 on)
Fire Incident	STRUC_TYPE	Type of structure (enclosed only)	1, 2
Fire Incident	STRUC_STAT	Building status	2

Casualties

When analyzing casualties, the basic incident file or the casualty files can be used. These files, however, produce different results because the tallies in the basic incident file may include EMS casualties that occur at the incident (see the sections above on *Casualty Considerations*). In the case of firefighter casualties, the tallies in the basic incident file also include exposure reports that in themselves are not injuries.

Civilian Casualties

Below are the basic parameters that are used to analyze civilian fire injuries and deaths. It is important to note that since a large number of civilian injuries and deaths occur in residential structures, specifically buildings, these incidents are typically analyzed. The parameters for residential buildings (and other groupings) are discussed earlier. These parameters would be included with injury parameters below for analyses of fire casualties in the various property or incident types.

Civilian Fire Injuries (from Civilian Fire Casualty Module)

The following parameters are used to analyze civilian injuries:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Civilian Fire Casualty	SEV	Severity of incident	NOT 5 or is NOT NULL

Civilian Fire Deaths

The following parameters are used to analyze civilian fire deaths:

Table	Field	Description	Value
Basic Incident	VERSION	Specifies NFIRS version	'5.0'
Basic Incident	AID	Aid provided between departments	NOT 3–4
Civilian Fire Casualty	SEV	Severity of incident	5

Firefighter Casualties

When analyzing casualties, the basic incident file or firefighter casualty file can be used. Both files, however, produce different results. This is because the basic incident file firefighter casualty fields (i.e., FF_DEATH and FF_INJ) include a large number of casualties from the EMS casualty file. In order to help eliminate the presence of the EMS casualties, the firefighter casualty file should be used. It is important to note, however, that some EMS casualties may still be counted as firefighter casualties even in the firefighter casualty file.

EMS casualties are present in the basic incident and firefighter casualty files because some incidents include both EMS and firefighter casualties. To help avoid having EMS casualty counts included in firefighter casualty counts, it may be necessary to include in the query: firefighter injuries (FF_INJ) are greater than zero or firefighter deaths (FF_DEATH) are greater than zero. By including this clause, the EMS casualties will be excluded from firefighter casualties.

Firefighter Injuries

The following parameters are used to analyze firefighter injuries:

Table	Field	Description	Value
Firefighter Casualty	VERSION	Specifies NFIRS version	'5.0'
Firefighter Casualty	SEVERITY	Severity of incident	NULL or NOT 1, 7 (pre-2005) NOT 1, 7 or NOT NULL (from 2005 on)
Basic Incident	FF_INJ	Count of firefighter injuries	> 0

Firefighter Deaths

The following parameters are used to analyze firefighter deaths:

Table	Field	Description	Value
Firefighter Casualty	VERSION	Specifies NFIRS version	'5.0'
Firefighter Casualty	SEVERITY	Severity of incident	7
Basic Incident	FF_DEATH	Count of firefighter deaths	> 0

Issues involving the firefighter casualty file are discussed in the section *Casualty Considerations*.

Determining Cause

Since the introduction of NFIRS Version 5.0, the implementation of the cause hierarchy has resulted in a steady increase in the percentages of unknown fire causes. This increase may be due, in part, to the fact that the original cause hierarchy (described in *Fire in the United States 1995–2004*, 14th ed.) does not apply as well to Version 5.0. Causal information now collected as part of NFIRS Version 5.0 was not incorporated in the old hierarchy. As a result, many incidents were assigned to the unknown cause category. As the hierarchy was originally designed for structures, incidents that did not fit well into the structure fire cause categories (e.g., vehicles and outside fires) were also assigned to the unknown cause category.

Structure Fires

To capture the wealth of data available in NFIRS 5.0, USFA developed a modified version of the previous cause hierarchy for structure fires as shown in the *Three-Level Structure Fire Cause Hierarchy* table that follows. The revised schema provides three levels of cause descriptions: a set of more detailed causes (priority cause description), a set of mid-level causes (cause description), and a set of high-level causes (general cause description). The prior-

ity cause description and the cause description existed previously as part of the original cause hierarchy, but have been expanded to capture the new 5.0 data.

The causes of fires are often a complex chain of events. To make it easier to grasp the "big picture," the 16 mid-level categories of fire causes such as heating, cooking, and playing with heat source are used by the USFA in their reports. The alternative is to present scores of detailed cause categories or scenarios, each of which would have a relatively small percentage of fires. For example, heating includes subcategories such as misuse of portable space heaters, wood stove chimney fires, and fires involving gas central heating systems. Experience has shown that the larger mid-level categories are useful for an initial presentation of the fire problem. A more detailed analysis can follow.

Fires are assigned to one of the 16 mid-level cause groupings using a hierarchy of definitions, approximately as shown in the *Mid-Level Structure Fire Cause Hierarchy in Hierarchical Order* table that follows. A fire is included in the highest category into which it fits on the list. If it does not fit the top category, then the second one is considered, and if not that one, the third, and so on. Once a match is found, the cause is assigned and no further checking of subsequent categories is done in the matrix. (See *Three-Level Structure Fire Cause Hierarchy* table note for an example.)

Three-Level Structure Fire Cause Hierarchy

Code	Priority Cause Description	Code	Cause Description	Code	General Cause Description
03	Exposure	12	Exposure	06	Exposure
04	Intentional	01	Intentional	01	Firesetting
05	Children Playing	02	Playing with Heat Source	01	Firesetting
06	Natural	11	Natural	02	Natural
07	Fireworks	09	Other Heat	05	Flame, Heat
08	Explosives	09	Other Heat	05	Flame, Heat
09	Smoking	03	Smoking	05	Flame, Heat
11	Heating	04	Heating	03	Equipment
12	Cooking	05	Cooking	03	Equipment
13	Air Conditioning	07	Appliances	03	Equipment
14	Electrical Distribution	06	Electrical Malfunction	04	Electrical
15	Appliances	07	Appliances	03	Equipment
16	Special Equipment	10	Other Equipment	03	Equipment
17	Processing Equipment	10	Other Equipment	03	Equipment
18	Torches	08	Open Flame	05	Flame, Heat
19	Service Equipment	10	Other Equipment	03	Equipment
20	Vehicle, Engine	10	Other Equipment	03	Equipment
21	Heat Source or Product Misuse	15	Other Unintentional, Careless	07	Unknown
22	Equipment Operation Deficiency	14	Equipment Misoperation, Failure	03	Equipment
23	Equipment Failure, Malfunction	14	Equipment Misoperation, Failure	03	Equipment
24	Other Unintentional	15	Other Unintentional, Careless	07	Unknown
25	Unclassified Fuel Powered Equipment	10	Other Equipment	03	Equipment
26	Unclassified Electrical Malfunction	06	Electrical Malfunction	04	Electrical
27	Matches, Candles	08	Open Flame	05	Flame, Heat
28	Open Fire	08	Open Flame	05	Flame, Heat
29	Other Open Flame, Spark	09	Other Heat	05	Flame, Heat
30	Friction, Hot Material	09	Other Heat	05	Flame, Heat
31	Ember, Rekindle	08	Open Flame	05	Flame, Heat
32	Other Hot Object	09	Other Heat	05	Flame, Heat
33	Exposure 2	12	Exposure	06	Exposure
34	Unknown	13	Unknown	07	Unknown
36	Other Playing	02	Playing with Heat Source	01	Firesetting
37	Trash, Rubbish	13	Unknown	07	Unknown
38	Investigation with Arson Module	16	Investigation with Arson Module	07	Unknown
39	Unclassified Equipment with Other or Unknown Fuel Source	13	Unknown	07	Unknown

Note: Fires are assigned to a cause category in the hierarchical order shown. For example, if the fire is judged to be intentionally set and a match was used to ignite it, it is classified as intentional and not open flame because intentional is higher on the list.

Mid-Level Structure Fire Cause Hierarchy in Hierarchical Order

Cause Category	Definition
Exposure	Caused by heat spreading from another hostile fire
Intentional	Cause of ignition is intentional or fire is deliberately set
Investigation with Arson Module	Cause is under investigation and a valid NFIRS Arson Module is present
Playing with Heat Source	Includes all fires caused by individuals playing with any materials contained in the categories below as well as fires where the factors contributing to ignition include playing with heat source; children playing fires are included in this category
Natural	Caused by the sun's heat, spontaneous ignition, chemicals, lightning, static discharge, high winds, storms, high water including floods, earthquakes, volcanic action, and animals
Other Heat	Includes fireworks, explosives, flame/torch used for lighting, heat or spark from friction, molten material, hot material, heat from hot or smoldering objects
Smoking	Cigarettes, cigars, pipes, and heat from undetermined smoking materials
Heating	Includes confined chimney or flue fire, fire confined to fuel burner/ boiler malfunction, central heating, fixed and portable local heating units, fireplaces and chimneys, furnaces, boilers, water heaters as source of heat
Cooking	Includes confined cooking fires, stoves, ovens, fixed and portable warming units, deep fat fryers, open grills as source of heat
Appliances	Includes televisions, radios, video equipment, phonographs, dryers, washing machines, dishwashers, garbage disposals, vacuum cleaners, hand tools, electric blankets, irons, hairdryers, electric razors, can openers, dehumidifiers, heat pumps, water-cooling devices, air conditioners, freezers and refrigeration equipment as source of heat
Electrical Malfunction	Includes electrical distribution, wiring, transformers, meter boxes, power switching gear, outlets, cords, plugs, surge protectors, electric fences, lighting fixtures, electrical arcing as source of heat
Other Equipment	Includes special equipment (radar, x-ray, computer, telephone, transmitters, vending machine, office machine, pumps, printing press, gardening tools, or agricultural equipment), processing equipment (furnace, kiln, other industrial machines), service, maintenance equipment (incinerator, elevator), separate motor or generator, vehicle in a structure, unspecified equipment
Open Flame, Spark (Heat From)	Includes torches, candles, matches, lighters, open fire, ember, ash, rekindled fire, backfire from internal combustion engine as source of heat
Other Unintentional, Careless	Includes misuse of material or product, abandoned or discarded materials or products, heat source too close to combustibles, other unintentional (mechanical failure/malfunction, backfire)
Equipment Misoperation, Failure	Includes equipment operation deficiency, equipment malfunction
Unknown	Cause of fire undetermined or not reported

Using the NFIRS Cause Categories

For USFA's analytic purposes, all structure fires in NFIRS fall into one of the 16 mid-level cause categories, denoted by a code:

Cause Code	Cause Description
01	Intentional
02	Playing with Heat Source
03	Smoking
04	Heating
05	Cooking
06	Electrical Malfunction
07	Appliances
08	Open Flame
09	Other Heat
10	Other Equipment
11	Natural
12	Exposure
13	Unknown
14	Equipment Misoperation, Failure
15	Other Unintentional, Careless
16	Investigation with Arson Module

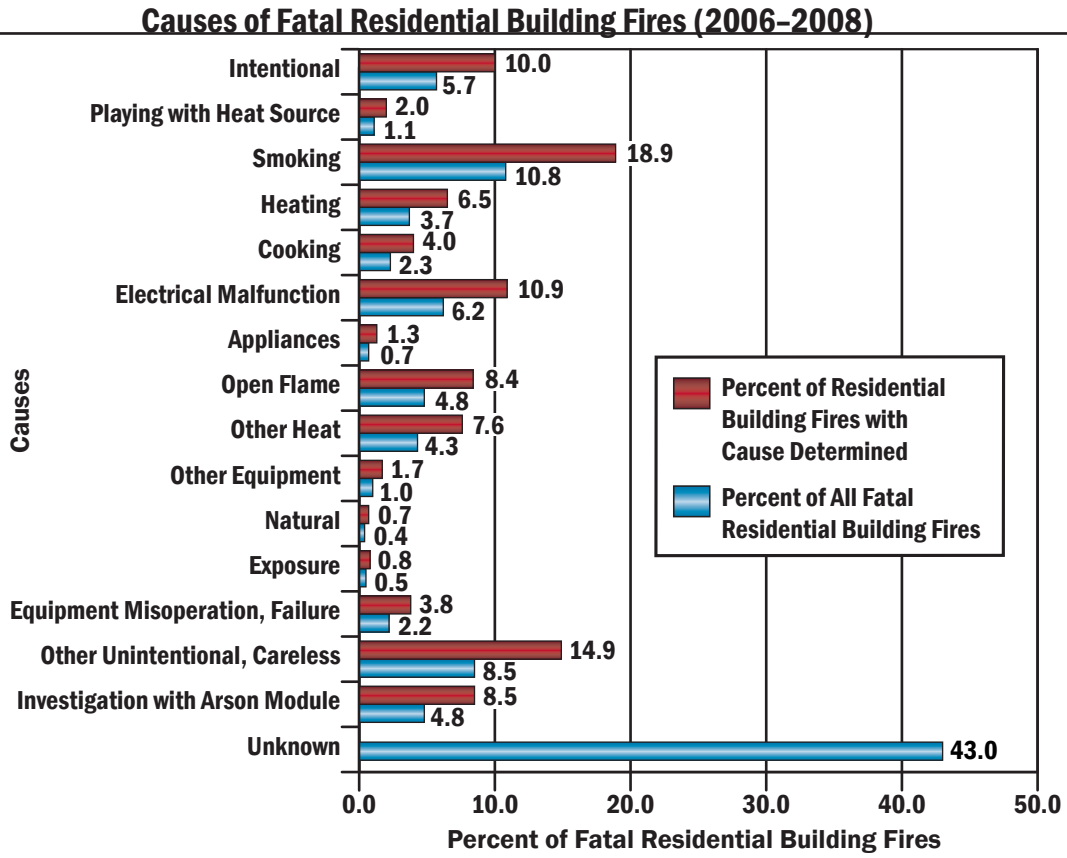
The cause categories include determinations of intent (intentional, investigation, playing, unintentional), accidental fires (smoking, heating, etc.), natural fires, exposure fires, and malfunction fires. The cause is not reported by the fire department but is interpreted from a combination of entries in the NFIRS modules. To maintain the cause hierarchy, there are a series of approximately 35 steps, or queries, which assign the fire incidents into separate priority "bins" which are aggregated to provide cause totals.

Appendix A, *Hierarchical Cause Matrix*, contains the current matrix of field values that determine each cause. Each row in the matrix represents an individual step based on its priority level in the cause hierarchy. Some causes have multiple steps and the steps may not be contiguous. There are two primary methods for counting incidents by cause:

- Create a reporting script in a database management system (e.g., SAS or Microsoft® Sequel Server), which is a program that runs a series of queries based on the cause matrix. This maintains a count of each cause category and produces a report of the final cause totals.
- Create a cause field in the basic incident table or create a separate cause table with ID keys, and then run a series of queries based on the cause matrix to assign a cause code to each structure fire incident record.

Using either method, the incidents must be removed from consideration once they have been assigned a cause. One can think of the cause categories as a series of bins in which the incident records are separated. Once a set of records is assigned to a cause (e.g., smoking), those records are figuratively placed in the smoking bin and are no longer available to be assigned to any cause further down the hierarchical scale. The result of this hierarchy is that the cause categories are mutually exclusive.

The following graphic is an example of an analysis of how fire data are assigned to the cause categories.



Source: NFIRS 5.0.
Note: Causes are listed in order of the USFA cause hierarchy for ease of comparison of fire causes across different aspects of the fire problem. Fires are assigned to one of 16-cause groupings using a hierarchy of definitions, approximately as shown in the chart above. A fire is included in the highest category into which it fits. If it does not fit the top category, then the second one is considered, and if not that one, the third, and so on. For example, if the fire is judged to be intentionally set and a match was used to ignite it, it is classified as intentional and not open flame because intentional is higher in the hierarchy.

Vehicle, Outside, and Other Fires

While these new cause categories have usefulness for the other property types—vehicle, outside, and other fires—there are limitations. USFA plans to investigate and develop specific cause categories for vehicle, outside, and other fires. Until then, the causes of fires for these property types presented in this edition are based on the distributions for the cause of ignition (CAUSE_IGN) data element located on the fire incident table. This data element captures a very broad sense of the cause of the fire.

At this time, there is no specific methodology for determining the cause of nonstructure (i.e., vehicle and outside) fires.

Cause of Fire Versus Cause of Fire Death/Fire Injury

There is a subtle, but important, difference in the phrases "cause of fire," "cause of a fire that results in deaths/injuries" (i.e., cause of fatal fires or of fires that result in injuries), and "cause of fire deaths." The latter phrase is an incorrect application of the fire cause methodology to the one-to-many relationship of fire to deaths and injuries.

The first phrase, "cause of fire," is a straightforward application of the NFIRS cause hierarchy to count the number (or determine the percent) of fires that fall into a particular category. The second phrase, "cause of a fire that results in deaths/injuries" is also a straightforward application of the hierarchy to count types of fires—this time to count only those fires where deaths or injuries result. An analysis of casualty-producing

fires is an informative analytic task that is very important to understanding the risks of specific behaviors or circumstances and to better identify life safety issues.

The phrase, "cause of fire deaths," is a common but misleading measure. Analysts are too often tempted to just count deaths and injuries without regard to the initiating circumstance—the fire itself. No casualties, regardless of the number, can occur without the single fire event. While multiple fatality or multiple injury fires are very important to capture, merely counting the casualties these fires produce, while interesting, is not necessarily the best measure of loss. For instance, consider the following fictitious scenario: 100 arson fires produce 300 deaths. The 300 deaths could be the result of say, 99 fires each with 1 death and 1 fire with 201 deaths or 100 arson fires with 3 deaths each. Regardless, 100 fires resulted in the deaths, and it is the 100 fires that need to be analyzed. In the former case, the one fire with substantial deaths indicates that an out-of-the ordinary event occurred and merits serious attention. In the latter case, where there are 100 fires of issue, it indicates a consistent multiple fatality cause that needs further attention.

Children Playing

The NFIRS 5.0 causes, as defined by USFA, no longer address the specific cause of "children playing." The USFA has opted for the overall cause of "playing with fire." To determine, to the extent possible, if a child playing with a heat source (such as matches or stove top) caused the fire, the analyst will need to include the human factors contributing to ignition (eight separate factors) equal to seven (age was a factor) in the query criteria, factors contributing to ignition and other requirements. In addition, an age range or cutoff for the associated age variable will need to be included. The details of these criteria are noted in Appendix A, *Hierarchical Cause Matrix* where priority cause is 5. *It is important to note that the priority causes cannot be taken out of context from the matrix; doing so will include incidents that would have been included in other priority codes based on earlier steps in the matrix. It is recommended that the entire cause matrix be implemented.*

Smoking-Related (Smoking) Versus Smoking Materials

The term "smoking-related fires" applies to those fires that are caused by cigarettes, cigars, pipes, and heat from undetermined smoking materials. USFA differentiates between smoking as a cause of fires and fires ignited by smoking materials. Smoking (or smoking-related fires) is considered a behavioral cause. Fires ignited by smoking materials are considered as a group of fires where smoking materials were the heat source. The two sets are similar but not identical. A deliberately-set fire with smoking materials as the heat of ignition would be considered an "intentional" fire; a fire unintentionally set by someone smoking (cigarettes, cigars, or other smoking materials) would be considered a "smoking-related fire."

As well, "smoking-related" or "smoking materials" is not synonymous with cigarettes. Cigarettes, however, are by far the leading smoking material heat source reported to NFIRS under the 'open flame and smoking materials' heat source category. In fact, between 2007 and 2009, cigarettes accounted for 84 percent of smoking material heat sources and rises to 99 percent when undetermined smoking materials are included.

A general discussion of analytic options for the distribution of "undetermined" and "other" codes can be found in the section, *Data Elements with Grouped Code Lists*.

Loss Measures

The fire death and injury rates per 1,000 fires and the total dollar loss (property and content loss) per fire are important metrics. Typically, when comparing these rates, USFA removes the set of incidents under investigation from the parent set, thereby removing the effect of the incidents under investigation from the comparison group. An example is shown below.

Loss Measures for Attic and Nonattic Residential Building Fires (3-year average, 2006–2008)

Measure	Attic Residential Building Fires	Nonattic Residential Building Fires
Average Loss:		
Fatalities/1,000 fires	2.5	5.5
Injuries/1,000 fires	11.2	28.6
Dollar loss/fire	$38,950	$15,550

Source: NFIRS 5.0.
Note: Average loss for fatalities and injuries is computed per 1,000 fires; average dollar loss is computed ***per fire*** and is rounded to the nearest $10.

As can be seen, these loss rates are considerably different. Note, however, as NFIRS is not a statistically-selected random sample, comparative statements should be made with caution.

Analysis of Common Data Elements

NFIRS is not a census of fires and fire losses. The results of data queries only reflect the numbers of fires and fire losses reported to NFIRS and not for the Nation as a whole. The analyst has two choices when presenting results: present the results as a percentage (preferred) or as a national estimate. The latter choice has special challenges and is generally not employed except to quantify the major areas of fire losses.

Deaths and Injuries

Civilian

Totals for civilian deaths or injuries can be derived by summing the values in the respective fields (OTH_DEATH, OTH_INJ) in the basic incident table. Alternatively, the casualty records can be used to count deaths and injuries, noting the issues concerning EMS casualties that may be included in the casualty file. For a more detailed discussion, see the earlier sections, *Casualty Considerations and Casualties*.

Firefighter

Unlike civilian casualties, totals for firefighter injuries cannot be derived by summing the values of FF_INJ in the basic incident table as these totals will include hazardous exposures. To derive the number of firefighter injuries for a given set of fires, the firefighter casualty records must be counted using the severity criteria noted earlier. Total firefighter deaths can be derived by summing the values of FF_DEATH with all AID codes included. Alternatively, both deaths and injuries can be counted using the severity criteria noted earlier. Nonetheless, mutual-aid records must be included for complete counts of firefighter injuries or deaths. For a more detailed discussion, see the earlier sections, *Casualty Considerations and Casualties*.

Property and Contents Loss

NFIRS 5.0 distinguishes between "content" and "property" loss. Content loss includes loss to the contents of a structure due to damage by fire, smoke, water, and overhaul. Property loss includes losses to the structure itself or to the property itself. Both content and property loss can be found in the Basic Module.

Total loss is the sum of the content loss and the property loss. Analysts are cautioned to be careful adding null values to nonnull values as the results can be unexpected—another reason to investigate how the chosen database or analytic tool handles null values.

For confined fires, the expectation is that the fire did not spread beyond the container (or rubbish for Incident Type 118) and hence, there was no property damage (damage to the structure itself) from the flames. There could be, however, property damage as a result of smoke, water, and overhaul.

Time of Alarm

For analytic purposes, the time of the fire alarm (ALARM) is used as an approximation for the general time the fire started. However, in NFIRS, it is the time the fire was reported to the fire department. Analyzing the time of alarm data is important because it provides information on when certain types of fires are occurring. A large amount of information can be obtained by looking at the peak hours when specific types of fires occur.

Month and Day

Numeric to date-time conversion may be necessary. Day of year analyses may reveal specific dates that may or may not be significant, depending on whether large-loss incidents are reflected or not. Certain types of fires are more common on certain days of the year or in certain months (e.g., the average number of reported residential building fires on Thanksgiving Day is nearly double that of those on all other days). By analyzing daily or monthly data, trends can be observed. Additional fire information can also be generated for these peak days or months. This information can provide the analyst with further insight on a specific fire problem.

Time, Month, and Day of Death or Injury

For deaths and injuries, the date-time analyses are based on the INC_DATE information from the casualty files. For month and day analyses, there may be valid reasons to use the ALARM data (the date-time data for the incident itself) rather than the casualty data. The same issues with the data and conversions noted above apply. Note that the time of the incident and the time of the casualty (INJ_DT_TIM) will not (or may not) be the same.

Day of Week

To determine the day of week (e.g., Monday), the analyst may need to use a built-in function in the database system or use an existing function from the analytic tool (e.g., spreadsheet or SAS). The INC_DATE or ALARM data may need to be converted to the format required by the function chosen. If the incident timing crosses dates (i.e., straddles midnight), the analyst may need to make appropriate calculations to account for the time differential.

Elapsed (Response) Time

Typically, this type of analysis is used for "response times" analyses. If no arrival time (ARRIVAL) is included or if the calculated response time appears to exceed 24 hours, the incident should be excluded. Incidents classified as automatic or mutual aid (AID = 3 or 4) should also be excluded to avoid double counting of aid incidents. Elapsed times are generally grouped in 30-second or 1-minute intervals.

Several caveats need to be kept in mind with respect to analyses of response times. First, they are subject to a variety of measurement errors when units report their arrival on scene prematurely or belatedly. Second, response times are frequently not comparable across fire-rescue systems because of the differing manners in which they are calculated. Also, it is difficult, if not impossible, to measure some components of response time. As well, care should be taken to accurately account for response times when an alarm time (ALARM) is very close to midnight and the arrival time (ARRIVAL) will necessarily be the next day. As both alarm and arrival time are specified as MMDDYYYYhhmm, the analyst should remember to include the day as well as the time in calculating response times.

Response times are measured from alarm time to arrival on scene, but there is uncertainty in the data. NFIRS 5.0 defines alarm time as "when the alarm was received by the fire department." This definition is vague and subjective. Some departments may read this definition to mean when the notification comes into the 9-1-1 communications center (9-1-1 activation) while others may read it as when the notification comes into the station (dispatch time). Thus, depending on the interpretation by the department, the times reported to NFIRS may or may not include call processing and dispatch time, which could typically take between 30 and 120 seconds.

Equipment Involved in Ignition

In a small group of incidents, equipment involved in ignition (EQUIP_INV) is coded as "none involved" (NNN or nnn) but the heat source (HEAT_SOURC) is coded as operating equipment (heat source is 10-13). If this occurs, these incidents are recoded as "undetermined" (UUU) in analyses of equipment involved.

Fire Spread

By definition, any confined fire (INC_TYPE 113 to 118) is confined to the object of origin. In terms of fire spread, this is equivalent to FIRE_SPRD = '1.' Some confined fires also have completed Fire Modules and have a record in the fire incident table (and may, unfortunately, have values other than FIRE_SPRD = '1' in data prior to 2006). Therefore, when doing analyses on fire spread that include the confined fire incident types, it is important to segregate those confined fires without a record in the fire incident table and count them as having FIRE_SPRD = '1.' The assumption *cannot* be made that, since FIRE_SPRD is a required variable, all null values result from confined fires and are actually "confined to object of origin." FIRE_SPRD is *only* required in the Fire Module when STRUC_TYPE is a "1" or a "2" (enclosed building or fixed portable or mobile structure) and the Structure Fire Module is called into play. As a result, there will be some "legitimate" null values.

Further, an error was found in the FIRE_SPRD variable for building fires. In the case where the data years are prior to 2006 and the "Confined to Origin" (CONF_ORIG) checkbox is set to a value of 1 on data entry, a value of 1 is also to be inserted into the fire spread (FIRE_SPRD) field. Instead, the USFA software mistakenly inserts a null value into the FIRE_SPRD field rather than a 1. This null value is not critical because the "1" value still exists in the CONF_ORIG field in the fire incident table. USFA corrected this issue in the 2006 and subsequent data. For prior years of data, there is a choice of a data correction or a workaround.

Workaround:

1. When doing analyses for fires confined to the object of origin, check for a value of "1" in the CONF_ORIG field rather than checking for a "1" in the FIRE_SPRD field (in the fire incident table).

Data Correction/Update:

2. Replace the NULL FIRE_SPRD values in the table with "1." To do so, run a simple script/procedure against the fire incident table that says (pseudo code follows):

```
if INC_TYPE between 113 and 118
and STRUC_TYPE = "1" OR "2" OR NULL
and CONF_ORIG = "1"
replace FIRE_SPRD with "1"
```

Data Elements with Grouped Code Lists

In most of the data elements with long code lists, regardless of the module, the codes are generally organized into major categories or groups of like items. When analyzing the resulting distributions, the analyst should consider both the leading category or group and the major individual code. Incident type and property use (discussed earlier) are also examples of these types of variables.

Primary data elements which follow this general pattern are

Field	Description	Table
INC_TYPE	Incident Type	Basic Incident
PROP_USE	Property Use	Basic Incident
AREA_ORIG	Area of Fire Origin	Fire Incident
HEAT_SOURC	Heat Source	Fire Incident
FIRST_IGN	Item First Ignited	Fire Incident
TYPE_MAT	Type of Material Ignited	Fire Incident
EQUIP_INV	Equipment Involved in Ignition	Fire Incident

Unknown, blank, and null entries are generally considered unknown and are distributed across the other valid entries (i.e., removed from the analysis) for some of these fields. Treatment of null values in property use is discussed in the section *Nonresidential Fires*.

In the very few instances where the major category includes an intermediate "other" code that crosses group boundaries, analysts may elect to distribute the "other" category across the group of codes. This specifically applies to heat source (HEAT_SOURC) 60, "heat from other open flame or smoking materials, other." USFA, however, does not follow this option for heat source 60 as USFA notes that the "other" category is for items not already specified in the code group. It is not an "unknown." As such, no distributing is warranted.[5]

Multiple Entry Data Elements

Multiple entry data elements require the analyst to combine the distributions from each of the elements into one overall distribution. Unknown, null, and blank values are not considered and the analysis is performed "only where a factor was specified or indicated." The denominator for the distribution is the number of incidents with at least one factor specified. As a result, the total percent distribution can (and usually does) total to greater than 100 percent.

The same factor value cannot be entered into more than one of the factor elements for an incident. The analyst, however, is well-served to check to ensure this and remove any duplicate values. Succeeding factors can only be entered if the preceding factor exists and is not N (no factor involved). Again, the analyst should confirm this. See the earlier section on *Factor Fields* for a more detailed discussion.

Primary data elements which follow this general pattern are

Data Element	Description	Table
FACT_IGN_1 to FACT_IGN_2	Factors Contributing to Ignition	Fire Incident
HUM_FAC_1 to HUM_FAC_8	Human Factors Contributing to Ignition	Fire Incident
FACT_INJ1 to FACT_INJ3	Factors Contributing to Injury	Civilian Fire Casualty
HUM_FACT1 to HUM_FACT8	Human Factors Contributing to Injury	Civilian Fire Casualty
SUP_FAC_1 to SUP_FAC_3	Fire Suppression Factors	Fire Incident

[5] USFA has analyzed heat source code 60 data for 2003, 2006, and 2008 using a stratified random sample of residential structure fires where the remarks field was completed for those incidents and where the heat source code was 60. The remarks were reviewed and then the heat source value was recoded to the appropriate value based on the information provided in the remarks field. The results for each year showed that the majority of the heat source 60 incidents should have been coded as kitchen/cooking fires (heat source 12) or chimney, flue fires (heat source 81 or 43). Very few of the sampled incidents were recoded as cigarettes, candles, or other heat source 60 decade codes. These results showed that the heat source 60 code should not be distributed as an unknown among the remaining heat source 60 decade codes. USFA and others strongly agree that the heat source 60 code should not be treated as an unknown and, therefore, should not be distributed over the heat source 61–69 categories.

If the factor data element also has grouped code lists, the analyst, as above, should consider both the leading group and the major individual code. Examples of both analyses are shown below.

Factors Contributing to Ignition for Fatal Residential Building Fires by Major Category (Where Factor Contributing Specified, 2006–2008)

Factor Contributing to Ignition Category	Percent of Fatal Residential Fires (Unknowns Apportioned)
Misuse of material or product	59.3
Electrical failure, malfunction	15.1
Other factors contributing to ignition	13.2
Operational deficiency	12.0
Mechanical failure, malfunction	4.8
Fire spread or control	2.7
Design, manufacture, installation deficiency	1.4
Natural condition	1.1

Source: NFIRS 5.0.
Notes: 1) Includes only incidents where factors that contributed to the ignition of the fire were specified.
2) Multiple factors contributing to fire ignition may be noted for each incident; total will exceed 100 percent.

Leading Factors Contributing to Ignition for Nonconfined Residential Building Smoking-Related Fires (Where Factor Contributing Specified, 2006–2008)

Factor Contributing to Ignition	Percent of Nonconfined Residential Smoking-Related Fires Where Contributing Factor Specified
Abandoned or discarded materials or products	66.8
Unspecified misuse of material or product	15.2
Heat source too close to combustibles	10.9

Source: NFIRS 5.0.
Notes: 1) Includes only incidents where factors that contributed to the ignition of the fire were specified.
2) Multiple factors contributing to fire ignition may be noted for each incident.

Smoke Alarms

In general, USFA presentation of the smoke alarm data in NFIRS requires a relatively straightforward approach by separating the available data into smoke alarm data for confined fires and for nonconfined fires. Smoke alarm data are collected at the fire incident level (not the casualty level). As such, USFA's analysis of smoke alarm data is not directly transferable to numbers (or percentages) of deaths and injuries.

Smoke alarm data are collected via seven data elements, one in the basic incident table and six in the fire incident table. The detector alerted occupants (DET_ALERT) field, from the basic incident table, is required for confined structure fires (but not for nonconfined structure fires). The six other variables are required for nonconfined building fires (those structure fires with STRUC_TYPE = 1, 2) and optional for confined fires (and not generally reported). The smoke alarm data elements are listed in the following table:

Table	Field	Description
Basic Incident	DET_ALERT	Detector Alerted Occupants
Fire Incident	DETECTOR	Detector Presence
Fire Incident	DET_TYPE	Detector Type
Fire Incident	DET_POWER	Detector Power
Fire Incident	DET_OPERAT	Detector Operation
Fire Incident	DET_EFFECT	Detector Effectiveness
Fire Incident	DET_FAIL	Detector Failure Reason

USFA has since abandoned its earlier smoke alarm analysis methodology. Detailed analyses of the data revealed inconsistencies in interpreting the relationships between the several data elements. These inconsistencies resulted in an overly complex analytic framework that relied on inferred relationships between the smoke alarm variables. Currently, USFA has opted to present the undistributed data for presence, operation, and effectiveness. Other smoke alarm variables are not analyzed at this time.

USFA analyzes the general presence of smoke alarms for all buildings. For confined fires, the variable DET_ALERT is used. As confined fires are only required to provide the basic incident data, the analyst does not have the information to determine the occupancy status. For nonconfined fires, the variable DETECTOR is used.

Because the effectiveness of smoke alarms (i.e., if the occupant heard and responded to the alarm) can only be measured if occupants are present, detailed analyses on the combination of presence, operation, and effectiveness of smoke alarms are generally undertaken for nonconfined fires in occupied buildings only. There are exceptions to this general rule, such as in analyses of buildings with multiple occupancies where some occupancies may be in use and others may be vacant, e.g., multifamily buildings.

Note: USFA does not distribute unknowns in its presentation of smoke alarm data.

Smoke Alarms in Confined Fires

The detector alerted occupants (DET_ALERT) data from the basic incident table are only used in the analysis of smoke alarms in confined structure fires and are used to determine solely whether the alarm alerted the occupant. USFA presents smoke alarm data for confined structure fires that are defined as building fires.

Note: Structure type (STRUC_TYPE), the data element that is used to determine whether a structure is a building, is not required for confined fires. As such, confined fires with no structure type reported are assumed to be building fires.

Note: If the occupant was *not* alerted by a smoke alarm, the analyst will not know whether the lack of notification was because:

- no alarm was in the vicinity;
- the alarm did not operate (for whatever reason, including fire too small);
- the smoke alarm was present and operated but the occupant was already aware of the fire; or
- no occupants were present at the time of the fire.

A typical analysis (with data source attribution and analysis notes) is shown in the following table.

NFIRS Smoke Alarm Data for Confined Multifamily Residential Building Fires (2005–2007)

Smoke Alarm Effectiveness	Count	Percent
Smoke alarm alerted occupants	61,555	46.7
Smoke alarm did not alert occupants	19,620	14.9
Unknown	50,656	38.4
Total Incidents	131,831	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in confined multifamily residential building fires. They are presented for informational purposes.

Smoke Alarms in Nonconfined Fires

For nonconfined fires, the data elements detector presence (DETECTOR), detector operation (DET_OPERAT), and detector effectiveness (DET_EFFECT) from the fire incident table are combined to present the full range of smoke alarm performance and effectiveness in alerting occupants. As these data elements are only required for building fires and other enclosed structures (logically, where one would expect smoke alarms to be located), only smoke alarm presence, operation, and effectiveness in building fires are presented. Typically, the presence of smoke alarms is presented as a stand-alone distribution then combined with the other two variables to present the full range of smoke alarm performance and effectiveness in nonconfined fires. Examples are shown below.

Presence of Smoke Alarms in Fatal Residential Building Fires (2006–2008)

Presence of Smoke Alarms	Percent
Present	37.7
None present	22.5
Undetermined	39.7
Null/Blank	<0.1

Source: NFIRS 5.0.
Note: Total may not add to 100 percent due to rounding.

NFIRS Smoke Alarm Data for Fatal Residential Building Fires in Occupied Housing (NFIRS, 2006–2008)

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count	Percent
Present	Fire too small to activate smoke alarm		9	0.3
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	209	6.5
		Smoke alarm alerted occupants, occupants failed to respond	83	2.6
		No occupants	1	0.0
		Smoke alarm failed to alert occupants	28	0.9
		Undetermined	147	4.6
	Smoke alarm failed to operate		266	8.3
	Undetermined		474	14.8
None present			706	22.1
Undetermined			1,272	39.8
Total Incidents			3,195	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in fatal residential building fires in occupied housing. They are presented for informational purposes. Total will not add to 100 percent due to rounding.

Automatic Extinguishing Systems

Like smoke alarm data, Automatic Extinguishing Systems (AES) data are collected by multiple data elements. The data elements are shown in the table below:

Table	Field	Description
Fire Incident	AES_PRES	AES Presence
Fire Incident	AES_TYPE	AES Type
Fire Incident	AES_OPER	AES Operation
Fire Incident	NO_SPR_OP	Number of Sprinklers Operating
Fire Incident	AES_FAIL	AES Failure Reason

As noted above, many fires in NFIRS 5.0 are confined fires without matching fire incident records. While smoke alarms have a data element in the Basic Module that captures some additional alarm data, AES/Sprinkler data are entirely captured in the fire incident table. To remove the bias that can be introduced by the lack of data from confined fires (INC_TYPE between 113 to 118), only nonconfined fires are included in analyses, that is, confined fires have been removed from the query.

At this time, USFA analyzes only the presence of AES.

Note: USFA does not distribute unknowns in its analyses of AES data.

Additional research is necessary on the AES data to further develop appropriate methodologies, as is the ongoing case with the smoke alarm data. The following table shows an example of an analysis of AES data.

NFIRS Automatic Extinguishing System (AES) Data for Vacant Residential Building Fires (2006–2008)

Presence of Automatic Extinguishing Systems	Count	Percent
AES present	474	1.0
Partial system present	32	0.1
AES not present	42,600	90.2
Unknown	4,120	8.7
Total Incidents	47,226	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of AESs in vacant residential building fires. They are presented for informational purposes.

APPENDIX A: HIERARCHICAL CAUSE MATRIX

Order	Incident Type	& or	Exp. #	& or	Area Origin	& or	Heat Source	& or	Item Ignited	& or	Wildland Fire Cause	& or	Cause of Ignition	& or	Ignition Factors	& or	Human Factors	& or	Wildland Age	& or	Equip. Involved	Priority Cause Code	Description	Cause	Comments
Data Field	INC_TYPE		EXP_ NO		AREA_ ORIG		HEAT_ SOURC		FIRST_ IGN		FIRE_CAUSE		CAUSE_ IGN		FACT_ IGN_1; FACT_ IGN_2		HUM_ FAC_1 to HUM_ FAC_8		AGE		EQUIP_INV				
1			> 0	&																		3	Exposure	12 Exposure	
2			0	&									1			&						4	Intentional	01 Intentional	Former Incendiary/Suspicious category now split into two categories: Intentional and Investigation with Arson Module. Arson Module criteria for selection is Case Status between 1 and 5.
3	Wildland Module submitted		0	&							7											4	Intentional Wildland		
4	Arson Report submitted (case status 1-5)			&									5									38	Investigation with Arson Module	16 Investigation with Arson Module	
5			0	&											19	&	7 & age < 10					5	Children Playing	02 Playing with Heat Source	Children Playing now combined with new 'other playing' category. Can still get 'children playing' from priority cause code (PCC). Removed allowance of any age in first checked category.
6			0	&									2			&	7 & age < 10					5	Children Playing		
7	Wildland Module submitted		0	&							8					&			age < 10			5	Children Playing		
			0	&											19							36	Other Playing	02 Playing with Heat Source	Other playing added as new PCC category. Included in cause 02
8			0	&			7x			or			4	or	65							6	Natural	11 Natural	Combined with the new 'natural' matrix check below
9			0	&			54															7	Fireworks	09 Other heat	
10			0	&			50 - 59 (excludes 54)															8	Explosives		
11			0	&			61 - 63															9	Smoking	03 Smoking	
12	114, 116, (Exclude 113)	or	0	&					Exclude (76 and EII 123, 124)	or											100, 120 -152	11	Heating	04 Heating	Exclude confined cooking fires. Exclude stove/insert fires where item first ignited is food.
13	113	or	0	&				or	(76 and EII 123, 124)	or											63x, 64x, 654	12	Cooking	05 Cooking	Include stoves, inserts where item first ignited is food
14			0	&																	111-117, 445, 652, 655-656	13	Air Conditioning	07 Appliances	

Order	Incident Type	& or	Exp. #	& or	Area Origin	& or	Heat Source	& or	Item Ignited	& or	Wildland Fire Cause	& or	Cause of Ignition	& or	Ignition Factors	& or	Human Factors	& or	Wildland Age	& or	Equip. Involved	Priority Cause Code	Description	Cause	Comments
Data Field	INC_TYPE		EXP_ NO		AREA_ ORIG		HEAT_ SOURC		FIRST_ IGN		FIRE_CAUSE		CAUSE_ IGN		FACT_ IGN_1; FACT_ IGN_2		HUM_ FAC_1 to HUM_ FAC_8		AGE		EQUIP_INV				
15			0	&											37					or	2xx (excludes 224-225, 228-229)	14	Electrical Dist.	06 Electrical Malfunction	Category now combined with Unclassified Electrical Malfunction
16			0	&																	31x (excludes 317), 345, 600, 611-612, 621-623, 651, 653, 73x-75x, 81x-86x, 871, 872 w/equip power <> 2x or 3x, 800, 874-876, 881-883, 891-897	15	Appliances	07 Appliances	
17	115, 117		0											&	!= 1x & 2x & 5x							16	Special Equip. Special Equip.	10 Other Equipment	Category now includes PCC 25 (Unclassified Fuel Powered Equipment). Includes priority check for following 'factors contributing' causes.
18			0	&										&	!= 1x & 2x & 5x						224, 34x (excludes 345), 361, 372-374, 376-377, 400, 41x, 42x, 431-432, 44x (excludes 445), 45x, 5xx, 700, 71x, 72x	16			
19			0	&										&	!= 1x & 2x & 5x						300, 317, 32x, 351, 353, 355-358, 371	17	Processing Equip.		
20			0	&											13					or	331-334	18	Torches	08 Open Flame	
21			0	&										&	!= 1x & 2x & 5x						225, 228-229, 352, 354, 362-365, 433-434	19	Service Equip.	10 Other Equipment	See note above for PCC 25
22	11x, 12x	&	0	&	Mob. Prop. Involved (MPI) = 2,3	or	68													or	375	20	Vehicle, Engine		
23			0	&			10-12 (and equip power = 1x, 2x, 3x, 4x)			&				&	!= 1x & 2x & 5x							25	Unclassified fuel powered equip.		

Order	Incident Type	& or	Exp. #	& or	Area Origin	& or	Heat Source	& or	Item Ignited	& or	Wildland Fire Cause	& or	Cause of Ignition	& or	Ignition Factors	& or	Human Factors	& or	Wildland Age	& or	Equip. Involved	Priority Cause Code	Description	Cause	Comments
Data Field	INC_TYPE		EXP_ NO		AREA_ ORIG		HEAT_ SOURC		FIRST_ IGN		FIRE_CAUSE		CAUSE_ IGN		FACT_ IGN_1; FACT_ IGN_2		HUM_ FAC_1 to HUM_ FAC_8		AGE		EQUIP_INV				
24			0	&			10-12 (and equip power NOT 1x-4x)							&	!= 1x & 2x & 5x							39	Unclassified equip. w/ other or unknown fuel source	13 Unknown	
25			0	&			13			or					30-36					or	200	26	Unclassified elec. malfunction	06 Electrical Malfunction	PCC 26 (Unclassified Electrical Malfunction) combined into cause category 06
26			0	&			64 - 66			or											872 (equip power=2x or 3x (gas or liq. fuel), 873	27	Matches, Candles	08 Open Flame	
27			0	&			67															28	Open fire		
28			0	&			60, 69															29	Other open flame, spark	09 Other heat	
29			0	&			41, 42															30	Friction, hot material		
30			0	&			43			or					72							31	Ember, re-kindle	08 Open Flame	
31			0	&			40															32	Other hot object	09 Other heat	
32			0	&											60-64, 66							6	Natural 2	11 Natural	Additional ‘natural’ from factors contributing
33			0	&											10x							21	Heat Source or Product Misuse	15 Other Unintentional, Careless	New category from 10 series of Factors Contributing to Ignition.
34			0	&											5x							22	Equipment Operation Deficiency	14 Equipment Misoperation, Failure	New category, includes cause of ignition ‘failure of equipment or heat source’ as final pass
35			0	&									3	or	2x							23	Equipment Failure, Malfunction		
36	118		0	&				or	96													37	Trash, rubbish	13 Unknown	New PCC for Trash related fires

Order	Incident Type	& or	Exp. #	& or	Area Origin	& or	Heat Source	& or	Item Ignited	& or	Wildland Fire Cause	& or	Cause of Ignition	& or	Ignition Factors	& or	Human Factors	& or	Wildland Age	& or	Equip. Involved	Priority Cause Code	Description	Cause	Comments
Data Field	INC_TYPE		EXP_NO		AREA_ORIG		HEAT_SOURC		FIRST_IGN		FIRE_CAUSE		CAUSE_IGN		FACT_IGN_1; FACT_IGN_2		HUM_FAC_1 to HUM_FAC_8		AGE		EQUIP_INV				
37			0	&									2									24	Other Unintentional	15 Other Unintentional, Careless	New category, from cause of ignition “Unintentional” as final pass
38			0	&			8x			or					70, 71, 73-75							33	Exposure 2	12 Exposure	
39																						34	Unknown	13 Unknown	Fell through the matrix with no match.

APPENDIX B: GENERAL INCIDENT GROUPING BY INCIDENT TYPE AND PROPERTY USE

Note: Nonresidential is defined by being "not residential" under the assumption that a residential structure will be clearly evident to the firefighter and the data collected as such. Generally speaking, if the property type is not specifically noted as "residential," it is then "nonresidential."

Incident Type	All Fires	Outside	Vehicle	Structure	Residential Structure	Nonresidential Structure	Other
Property Use (PROP_USE)					**400 series**	**not 400 series excludes null from 2006 on**	
Null							✓*
100	✓						✓
111-118	✓			✓	✓	✓	
120-123	✓			✓	✓	✓	
130s, MOB_IN-VOL=1, 3	✓		✓				
130s, MOB_ INVOL=2,N, NULL							✓
140s	✓	✓					
150s	✓	✓					
160s less 163	✓	✓					
163	✓						✓
170-173	✓	✓					
101-109	*Undesignated*						✓
180-189							✓
190-199							✓

*Only property uses (PROP_USE) with null values prior to 2006 are collated as "Other" properties. As property use is required from 2006 on, property uses with a null value are considered invalid and removed from analyses.

APPENDIX C: NFIRS PDR FILE LAYOUTS

In the file layout tables that follow, the key identification (ID) fields are noted in red text.

Basic Incident Table (basicincident.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	DEPT_STA	Fire Department Station	X	3	
8	INC_TYPE	Incident Type	C	3	
9	ADD_WILD	Address on Wildland Flag	X	1	
10	AID	Aid Given or Received	C	1	
11	ALARM	Alarm Date and Time	N	12	MMDDYYYYhhmm
12	ARRIVAL	Arrival Date and Time	N	12	
13	INC_CONT	Incident Controlled Date and Time	N	12	
14	LU_CLEAR	Last Unit Cleared Date and Time	N	12	
15	SHIFT	Shift	X	1	
16	ALARMS	Alarms	X	2	
17	DISTRICT	District	X	3	
18	ACT_TAK1	Actions Taken #1	C	2	
19	ACT_TAK2	Actions Taken #2	C	2	
20	ACT_TAK3	Actions Taken #3	C	2	
21	APP_MOD	Apparatus/Personnel Module Used	X	1	
22	SUP_APP	Suppression Apparatus	N	4	
23	EMS_APP	EMS Apparatus	N	4	
24	OTH_APP	Other Apparatus	N	4	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
25	SUP_PER	Suppression Personnel	N	4	
26	EMS_PER	EMS Personnel	N	4	
27	OTH_PER	Other Personnel	N	4	
28	RESOU_AID	Resources Include Mutual Aid	Y	1	
29	PROP_LOSS	Property Loss	N	9	
30	CONT_LOSS	Contents Loss	N	9	
31	PROP_VAL	Property Value	N	9	
32	CONT_VAL	Contents Value	N	9	
33	FF_DEATH	Fire Service Deaths	N	3	
34	OTH_DEATH	Other Fire Deaths	N	3	
35	FF_INJ	Fire Service Injuries	N	3	
36	OTH_INJ	Other Fire Injuries	N	3	
37	DET_ALERT	Detector Alerted Occupants	C	1	
38	HAZ_REL	Hazardous Material Released	C	1	
39	MIXED_USE	Mixed Use	C	2	
40	PROP_USE	Property Use	C	3	
41	CENSUS	Census Tract	X	6	

Basic Incident Address Table (incidentaddress.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	LOC_TYPE	Location Type	C	1	Incident Address
7	NUM_MILE	Number or Milepost	X	8	Incident Address
8	STREET_PRE	Street Prefix	C	2	Incident Address
9	STREETNAME	Street or Highway Name	X	30	Incident Address
10	STREETTYPE	Street Type	C	4	Incident Address
11	STREETSUF	Street Suffix	C	2	Incident Address
12	APT_NO	Apartment Number	X	15	Incident Address
13	CITY	City	X	20	Incident Address
14	STATE_ID	State	C	2	Incident Address
15	ZIP5	Zip 5	X	5	Incident Address
16	ZIP4	Zip 4	X	4	Incident Address
17	X_STREET	Cross Street or Directions	X	30	Incident Address

Basic Incident Aid Given or Received Table (basicaid.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	NFIR_VER	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	FDIDRECAID	FDID Receiving Aid	X	5	
8	FDIDSTREC	FDID State Receiving Aid	C	2	
9	INC_NOFDID	Incident Number of FDID Receiving Aid	X	7	

Fire Incident Table (fireincident.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	NUM_UNIT	Number of Residential Units	N	4	
8	NOT_RES	Not Residential Flag	Y	1	
9	BLDG_INVOL	Number of Buildings Involved	N	3	
10	ACRES_BURN	Acres Burned	N	6	
11	LESS_1ACRE	Less Than One Acre	Y	1	
12	ON_SITE_M1	On Site Materials #1	C	3	
13	MAT_STOR1	Material Storage Use #1	C	1	
14	ON_SITE_M2	On Site Materials #2	C	3	
15	MAT_STOR2	Material Storage Use #2	C	1	
16	ON_SITE_M3	On Site Materials #3	C	3	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
17	MAT_STOR3	Material Storage Use #3	C	1	
18	AREA_ORIG	Area of Origin	C	2	
19	HEAT_SOURC	Heat Source	C	2	
20	FIRST_IGN	Item First Ignited	C	2	
21	CONF_ORIG	Confined To Origin	C	1	
22	TYPE_MAT	Type of Material	C	2	
23	CAUSE_IGN	Cause of Ignition	C	1	
24	FACT_IGN_1	Factors Contributing To Ignition #1	C	2	
25	FACT_IGN_2	Factors Contributing To Ignition #2	C	2	
26	HUM_FAC_1	Human Factors #1	C	1	
27	HUM_FAC_2	Human Factors #2	C	1	
28	HUM_FAC_3	Human Factors #3	C	1	
29	HUM_FAC_4	Human Factors #4	C	1	
30	HUM_FAC_5	Human Factors #5	C	1	
31	HUM_FAC_6	Human Factors #6	C	1	
32	HUM_FAC_7	Human Factors #7	C	1	
33	HUM_FAC_8	Human Factors #8	C	1	
34	AGE	Age of Person	F	3.2	Associated with Human Factor code 7
35	SEX	Sex of Person	C	1	Associated with Human Factor code 7
36	EQUIP_INV	Equipment Involved	C	3	
37	SUP_FAC_1	Suppression Factors #1	C	3	
38	SUP_FAC_2	Suppression Factors #2	C	3	
39	SUP_FAC_3	Suppression Factors #3	C	3	
40	MOB_INVOL	Mobile Property Involved	C	1	
41	MOB_TYPE	Mobile Property Type	C	2	
42	MOB_MAKE	Mobile Property Make	C	2	
43	MOB_MODEL	Mobile Property Model	X	25	
44	MOB_YEAR	Mobile Property Year	N	4	4 digit year only

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
45	MOB_LIC_PL	Mobile Property License Plate	X	10	
46	MOB_STATE	Mobile Property State	C	2	
47	MOB_VIN_NO	Mobile Property VIN Number	X	17	
48	EQ_BRAND	Equipment Brand	X	25	
49	EQ_MODEL	Equipment Model	X	25	
50	EQ_SER_NO	Equipment Serial Number	X	25	
51	EQ_YEAR	Equipment Year	N	4	4 digit year only
52	EQ_POWER	Equipment Power	C	2	
53	EQ_PORT	Equipment Portability	C	1	
54	FIRE_SPRD	Fire Spread	C	1	
55	STRUC_TYPE	Structure Type	C	1	Beginning of Structure Fire Information
56	STRUC_STAT	Structure Status	C	1	
57	BLDG_ABOVE	Building Height: Stories Above Grade	N	3	
58	BLDG_BELOW	Building Height: Stories Below Grade	N	2	
59	BLDG_LGTH	Building Length	N	4	
60	BLDG_WIDTH	Building Width	N	4	
61	TOT_SQ_FT	Total Square Feet	N	8	
62	FIRE_ORIG	Fire Origin	N	3	+ or -, negative numbers indicate below grade
63	ST_DAM_MIN	Number of Stories with Damage: Minor	N	3	
64	ST_DAM_SIG	Number of Stories with Damage: Significant	N	3	
65	ST_DAM_HVY	Number of Stories with Damage: Heavy	N	3	
66	ST_DAM_XTR	Number of Stories with Damage: Extreme	N	3	
67	FLAME_SPRD	No Flame Spread/Same As First/Unknown	Y	1	
68	ITEM_SPRD	Item Contributing Most to Spread	C	2	
69	MAT_SPRD	Type Material Contributing Most To Spread	C	2	
70	DETECTOR	Detector Presence	C	1	
71	DET_TYPE	Detector Type	C	1	
72	DET_POWER	Detector Power	C	1	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
73	DET_OPERAT	Detector Operation	C	1	
74	DET_EFFECT	Detector Effectiveness	C	1	
75	DET_FAIL	Detector Failure Reason	C	1	
76	AES_PRES	AES Presence	C	1	
77	AES_TYPE	AES Type	C	1	
78	AES_OPER	AES Operation	C	1	
79	NO_SPR_OP	Number of Sprinklers Operating	N	3	
80	AES_FAIL	AES Failure Reason	C	1	

Civilian Fire Casualty Table (civiliancasualty.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	SEQ_NUMBER	Civilian Fire Casualty Sequence Number	N	3	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	GENDER	Gender	C	1	
9	AGE	Age	F	3.2	
10	RACE	Race	C	1	
11	ETHNICITY	Ethnicity	C	1	
12	AFFILIAT	Affiliation	C	1	
13	INJ_DT_TIM	Injury Date and Time	N	12	MMDDYYYYhhmm
14	SEV	Severity	C	1	
15	CAUSE_INJ	Cause of Injury	C	1	
16	HUM_FACT1	Human Factor Contributing to Injury #1	C	1	
17	HUM_FACT2	Human Factor Contributing to Injury #2	C	1	
18	HUM_FACT3	Human Factor Contributing to Injury #3	C	1	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
19	HUM_FACT4	Human Factor Contributing to Injury #4	C	1	
20	HUM_FACT5	Human Factor Contributing to Injury #5	C	1	
21	HUM_FACT6	Human Factor Contributing to Injury #6	C	1	
22	HUM_FACT7	Human Factor Contributing to Injury #7	C	1	
23	HUM_FACT8	Human Factor Contributing to Injury #8	C	1	
24	FACT_INJ1	Factors Contributing to Injury #1	C	2	
25	FACT_INJ2	Factors Contributing to Injury #2	C	2	
26	FACT_INJ3	Factors Contributing to Injury #3	C	2	
27	ACTIV_INJ	Activity When Injured	C	1	
28	LOC_INC	Location at Time of Incident	C	1	
29	GEN_LOC_IN	General Location at Time of Injury	C	1	
30	STORY_INC	Story at Start of Incident	N	3	+ or -, negative numbers indicate below grade
31	STORY_INJ	Story Where Injury Occurred	N	3	+ or -, negative numbers indicate below grade
32	SPC_LOC_IN	Specific Location at Time of Injury	C	2	
33	PRIM_SYMP	Primary Apparent Symptom	C	2	
34	BODY_PART	Primary Part of Body Injured	C	1	
35	CC_DISPOS	Disposition	C	1	

Fire Service Casualty Table (ffcasualty.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	FF_SEQ_NO	Fire Service Casualty Sequence Number	N	3	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	GENDER	Gender	C	1	
9	CAREER	Career	C	1	
10	AGE	Age	N	3	
11	INJ_DATE	Injury Date and Time	N	12	MMDDYYYYhhmm
12	RESPONSES	Responses	N	2	
13	ASSIGNMENT	Usual Assignment	C	1	
14	PHYS_COND	Physical Condition	C	1	
15	SEVERITY	Severity	C	1	
16	TAKEN_TO	Taken to	C	1	
17	ACTIVITY	Activity at Time of Injury	C	2	
18	SYMPTOM	Primary Apparent Symptom	C	2	
19	PABI	Primary Area of Body Injured	C	2	
20	CAUSE	Cause of Firefighter Injury	C	1	
21	FACTOR	Factor Contributing to Injury	C	2	
22	OBJECT	Object Involved in Injury	C	2	
23	WIO	Where Injury Occurred	C	1	
24	RELATION	Injury Relation to Structure	C	1	
25	STORY	Story of Injury	N	3	+ or -, negative numbers indicate below grade
26	LOCATION	Specific Location	C	2	
27	VEHICLE	Vehicle Type	C	1	
28	PROT_EQP	Protective Equipment Contributed to Injury	C	1	

Fire Service Equipment Failure Table (ffequipfail.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	CAS_SEQ_NO	Fire Service Casualty Sequence Number	N	3	Key Field
7	EQP_SEQ_NO	Equipment Failure Sequence Number	N	3	Key Field
8	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
9	EQUIP_ITEM	Equipment Item	C	2	
10	EQP_PROB	Equipment Problem	C	2	
11	EQP_MAN	Equipment Manufacturer	X	12	
12	EQP_MOD	Equipment Model	X	12	
13	EQP_SER_NO	Equipment Serial Number	X	12	

Wildland Fire Table (wildlands.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	LATITUDE	Latitude	F	2.2	
8	LONGITUDE	Longitude	F	3.2	
9	TOWNSHIP	Township	F	3.1	
10	NORTH_SOU	North/South	C	1	
11	RANGE	Range	N	3	
12	EAST_WEST	East/West	C	1	
13	SECTION	Section	N	2	
14	SUBSECTION	Subsection	C	4	
15	MERIDIAN	Meridian	C	2	
16	AREA_TYPE	Area Type	C	1	
17	FIRE_CAUSE	Wildland Fire Cause	C	1	
18	HUM_FACT1	Human Factors Contributing #1	C	1	
19	HUM_FACT2	Human Factors Contributing #2	C	1	
20	HUM_FACT3	Human Factors Contributing #3	C	1	
21	HUM_FACT4	Human Factors Contributing #4	C	1	
22	HUM_FACT5	Human Factors Contributing #5	C	1	
23	HUM_FACT6	Human Factors Contributing #6	C	1	
24	HUM_FACT7	Human Factors Contributing #7	C	1	
25	HUM_FACT8	Human Factors Contributing #8	C	1	
26	FACT_IGN1	Factors Contributing to Ignition #1	C	2	
27	FACT_IGN2	Factors Contributing to Ignition #2	C	2	
28	SUPP_FACT1	Fire Suppression Factors #1	C	3	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
29	SUPP_FACT2	Fire Suppression Factors #2	C	3	
30	SUPP_FACT3	Fire Suppression Factors #3	C	3	
31	HEAT_SOURC	Heat Source	C	2	
32	MOB_PROP	Mobile Property Type	C	2	
33	EQ_INV_IGN	Equipment Involved In Ignition	C	3	
34	NFDRS_ID	NFDRS Weather Station ID	A	6	
35	WEATH_TYPE	Weather Type	C	2	
36	WIND_DIR	Wind Direction	C	1	
37	WIND_SPEED	Wind Speed	N	3	
38	AIR_TEMP	Air Temperature	N	3	+ or -
39	REL_HUMID	Relative Humidity	N	3	
40	FUEL_MOIST	Fuel Moisture	N	2	
41	DANGR_RATE	Fire Danger Rating	C	1	
42	BLDG_INV	Number of Buildings Involved	N	3	
43	BLDG_THR	Number of Buildings Threatened	N	3	
44	ACRES_BURN	Total Acres Burned	F	9.1	
45	CROP_BURN1	Primary Crop Burned 1	X	25	
46	CROP_BURN2	Primary Crop Burned 2	X	25	
47	CROP_BURN3	Primary Crop Burned 3	X	25	
48	UNDET_BURN	Undetermined Acres Burned %	N	3	
49	TAX_BURN	Tax Paying Acres Burned %	N	3	
50	NOTAX_BURN	Non-Tax Paying Acres Burned %	N	3	
51	LOCAL_BURN	City, Town, Village, Local Acres Burned %	N	3	
52	COUTY_BURN	County or parish Acres Burned %	N	3	
53	ST_BURN	State or province Acres Burned %	N	3	
54	FED_BURN	Federal Acres Burned %	N	3	
55	FOREI_BURN	Foreign Acres Burned %	N	3	
56	MILIT_BURN	Military Acres Burned %	N	3	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
57	OTHER_BURN	Other Acres Burned %	N	3	
58	PROP_MANAG	Property Management Ownership	C	1	
59	FED_CODE	Federal Agency Code	X	5	
60	NFDRS_FM	NFDRS Fuel Model at Origin	C	2	
61	PERSON_FIR	Person Responsible for Fire	C	1	
62	GENDER	Gender	C	1	
63	AGE	Age	F	3.2	
64	ACTIVITY_W	Activity of Person	C	2	
65	HORIZ_DIS	Horizontal Distance From ROW	N	2	
66	TYPE_ROW	Type of ROW	C	3	
67	ELEVATION	Elevation	N	5	
68	POS_SLOPE	Relative Position on Slope	C	1	
69	ASPECT	Aspect	C	1	
70	FLAME_LGTH	Flame Length	N	2	
71	SPREAD_RAT	Rate of Spread	N	3	

EMS Table (ems.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	PATIENT_NO	EMS Patient Sequence Number	N	3	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	ARRIVAL	Arrived at Patient Date and Time	N	12	MMDDYYYYhhmm
9	TRANSPORT	Patient Transfer Date and Time	N	12	MMDDYYYYhhmm
10	PROVIDER_A	Provider Impression/Assessment	C	2	
11	AGE	Age	F	3.2	
12	GENDER	Gender	C	1	
13	RACE	Race	C	1	
14	ETH_EMS	Ethnicity	C	1	
15	HUM_FACT1	Human Factors #1	C	1	
16	HUM_FACT2	Human Factors #2	C	1	
17	HUM_FACT3	Human Factors #3	C	1	
18	HUM_FACT4	Human Factors #4	C	1	
19	HUM_FACT5	Human Factors #5	C	1	
20	HUM_FACT6	Human Factors #6	C	1	
21	HUM_FACT7	Human Factors #7	C	1	
22	HUM_FACT8	Human Factors #8	C	1	
23	OTHER_FACT	Other Factors	C	1	
24	SITE_INJ1	Body Sites of Injury #1	C	1	
25	SITE_INJ2	Body Sites of Injury #2	C	1	
26	SITE_INJ3	Body Sites of Injury #3	C	1	
27	SITE_INJ4	Body Sites of Injury #4	C	1	
28	SITE_INJ5	Body Sites of Injury #5	C	1	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
29	INJ_TYPE1	Injury Types #1	C	2	
30	INJ_TYPE2	Injury Types #2	C	2	
31	INJ_TYPE3	Injury Types #3	C	2	
32	INJ_TYPE4	Injury Types #4	C	2	
33	INJ_TYPE5	Injury Types #5	C	2	
34	CAUSE_ILL	Cause of Illness/Injury	C	2	
35	PROC_USE1	Procedures Used #1	C	2	
36	PROC_USE2	Procedures Used #2	C	2	
37	PROC_USE3	Procedures Used #3	C	2	
38	PROC_USE4	Procedures Used #4	C	2	
39	PROC_USE5	Procedures Used #5	C	2	
40	PROC_USE6	Procedures Used #6	C	2	
41	PROC_USE7	Procedures Used #7	C	2	
42	PROC_USE8	Procedures Used #8	C	2	
43	PROC_USE9	Procedures Used #9	C	2	
44	PROC_USE10	Procedures Used #10	C	2	
45	PROC_USE11	Procedures Used #11	C	2	
46	PROC_USE12	Procedures Used #12	C	2	
47	PROC_USE13	Procedures Used #13	C	2	
48	PROC_USE14	Procedures Used #14	C	2	
49	PROC_USE15	Procedures Used #15	C	2	
50	PROC_USE16	Procedures Used #16	C	2	
51	PROC_USE17	Procedures Used #17	C	2	
52	PROC_USE18	Procedures Used #18	C	2	
53	PROC_USE19	Procedures Used #19	C	2	
54	PROC_USE20	Procedures Used #20	C	2	
55	PROC_USE21	Procedures Used #21	C	2	
56	PROC_USE22	Procedures Used #22	C	2	
57	PROC_USE23	Procedures Used #23	C	2	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
58	PROC_USE24	Procedures Used #24	C	2	
59	PROC_USE25	Procedures Used #25	C	2	
60	SAFE_EQP1	Safety Equipment Used #1	C	1	
61	SAFE_EQP2	Safety Equipment Used #2	C	1	
62	SAFE_EQP3	Safety Equipment Used #3	C	1	
63	SAFE_EQP4	Safety Equipment Used #4	C	1	
64	SAFE_EQP5	Safety Equipment Used #5	C	1	
65	SAFE_EQP6	Safety Equipment Used #6	C	1	
66	SAFE_EQP7	Safety Equipment Used #7	C	1	
67	SAFE_EQP8	Safety Equipment Used #8	C	1	
68	ARREST	Pre or Post Arrival Arrest	C	1	
69	ARR_DES1	Pre-Arrival Arrest Descriptors #1	C	1	
70	ARR_DES2	Pre-Arrival Arrest Descriptors #2	C	1	
71	AR_RHYTHM	Initial Arrest Rhythm	C	1	
72	IL_CARE	Initial Level of Care	C	1	
73	HIGH_CARE	Highest Level of Care	C	1	
74	PAT_STATUS	Patient Status	C	1	
75	PULSE	Pulse on Transfer	C	1	
76	EMS_DISPO	Disposition	C	1	

Hazardous Material Table (hazmat.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	REL_FROM	Released From	C	1	
8	REL_STORY	Story of Release	N	3	+ or -, negative numbers indicate below grade
9	POP_DENS	Population Density	C	1	
10	AFFEC_MEAS	Area Affected Measurement	N	4	
11	AFFEC_UNIT	Area Affected Units	C	1	
12	EVAC_MEAS	Area Evacuated Measurement	N	4	
13	EVAC_UNIT	Area Evacuated Units	C	1	
14	PEOP_EVAC	Estimated Number of People Evacuated	N	6	
15	BLDG_EVAC	Estimated Number of Buildings Evacuated	N	4	
16	HAZ_ACT1	Hazmat Actions Taken #1	C	2	
17	HAZ_ACT2	Hazmat Actions Taken #2	C	2	
18	HAZ_ACT3	Hazmat Actions Taken #3	C	2	
19	OCCUR_FIRS	Occurred First	C	1	
20	CAUSE_REL	Cause of Release	C	1	
21	FACT_REL1	Factors Contributing to Release #1	C	2	
22	FACT_REL2	Factors Contributing to Release #2	C	2	
23	FACT_REL3	Factors Contributing to Release #3	C	2	
24	MIT_FACT1	Mitigating Factors #1	C	2	
25	MIT_FACT2	Mitigating Factors #2	C	2	
26	MIT_FACT3	Mitigating Factors #3	C	2	
27	EQ_INV_REL	Equipment Involved in Release	C	3	
28	HAZ_DISPO	Disposition	C	1	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
29	HAZ_DEATH	Hazmat Civilian Deaths	N	4	
30	HAZ_INJ	Hazmat Civilian Injuries	N	4	

Hazardous Material Chemical Table (hazchem.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	SEQ_NUMBER	Hazmat Chemical Sequence Number	N	2	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	UN_NUMBER	UN Number	X	4	
9	DOT_CLASS	DOT Hazard Classification	C	2	
10	CAS_REGIS	CAS Registration	X	10	
11	CHEM_NAME	Chemical Name	X	50	
12	CONT_TYPE	Container Type	C	2	
13	CONT_CAP	Estimated Container Capacity	N	9	
14	CAP_UNIT	Capacity Units	C	2	
15	AMOUNT_REL	Estimated Amount Released	N	9	
16	UNITS_REL	Released Units	C	2	
17	PHYS_STATE	Physical State When Released	C	1	
18	REL_INTO	Released Into	C	1	

Hazardous Material Mobile Property Type Table (hazmobprop.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	MP_TYPE	Mobile Property Type	C	2	
8	MP_MAKE	Mobile Property Make	C	2	
9	MP_MODEL	Mobile Property Model	X	25	
10	MP_YEAR	Mobile Property Year	N	4	4 digit year only
11	MP_LICENSE	Mobile Property License Plate	X	10	
12	MP_STATE	Mobile Property State	C	2	
13	MP_DOT_ICC	Mobile Property DOT/ICC Number	X	17	

Hazardous Material Equipment Involved Table (hazmatequipinvolved.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	EQ_BRAND	Equipment Brand	X	25	
8	EQ_MODEL	Equipment Model	X	25	
9	EQ_SER_NO	Equipment Serial Number	X	25	
10	EQ_YEAR	Equipment Year	N	4	4 digit year only

Arson Table (arson.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	CASE_STAT	Case Status	C	1	
8	AVAIL_MFI	Availability of Material First Ignited	C	1	
9	MOT_FACTS1	Suspected Motivation Factors #1	C	2	
10	MOT_FACTS2	Suspected Motivation Factors #2	C	2	
11	MOT_FACTS3	Suspected Motivation Factors #3	C	2	
12	GRP_INVOL1	Apparent Group Involvement #1	C	1	
13	GRP_INVOL2	Apparent Group Involvement #2	C	1	
14	GRP_INVOL3	Apparent Group Involvement #3	C	1	
15	ENTRY_METH	Entry Method	C	2	
16	EXT_FIRE	Extent of Fire Involvement on Arrival	C	1	
17	DEVI_CONT	Incendiary Devices: Container	C	2	
18	DEVI_IGNIT	Incendiary Devices: Ignition/Delay Device	C	2	
19	DEVI_FUEL	Incendiary Devices: Fuel	C	2	
20	INV_INFO1	Other Investigative Information #1	C	1	
21	INV_INFO2	Other Investigative Information #2	C	1	
22	INV_INFO3	Other Investigative Information #3	C	1	
23	INV_INFO4	Other Investigative Information #4	C	1	
24	INV_INFO5	Other Investigative Information #5	C	1	
25	INV_INFO6	Other Investigative Information #6	C	1	
26	INV_INFO7	Other Investigative Information #7	C	1	
27	INV_INFO8	Other Investigative Information #8	C	1	
28	PROP_OWNER	Property Ownership	C	1	

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
29	INIT_OB1	Initial Observations #1	C	1	
30	INIT_OB2	Initial Observations #2	C	1	
31	INIT_OB3	Initial Observations #3	C	1	
32	INIT_OB4	Initial Observations #4	C	1	
33	INIT_OB5	Initial Observations #5	C	1	
34	INIT_OB6	Initial Observations #6	C	1	
35	INIT_OB7	Initial Observations #7	C	1	
36	INIT_OB8	Initial Observations #8	C	1	
37	LAB_USED1	Laboratory Used #1	C	1	
38	LAB_USED2	Laboratory Used #2	C	1	
39	LAB_USED3	Laboratory Used #3	C	1	
40	LAB_USED4	Laboratory Used #4	C	1	
41	LAB_USED5	Laboratory Used #5	C	1	
42	LAB_USED6	Laboratory Used #6	C	1	

Arson Agency Referral Table (arsonagencyreferal.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	AGENCY_NAM	Agency Name	X	30	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	AG_ST_NUM	Agency Street Number	X	8	
9	AG_ST_PREF	Agency Street Prefix	C	2	
10	AG_STREET	Agency Street or Highway	X	30	
11	AG_ST_TYPE	Agency Street Type	C	4	
12	AG_ST_SUFF	Agency Street Suffix	C	2	
13	AG_APT_NO	Agency Apartment Number	X	15	
14	AG_CITY	Agency City	X	20	
15	AG_STATE	Agency State	C	2	
16	AG_ZIP5	Agency ZIP 5 Code	X	5	1st 5 of Zip
17	AG_ZIP4	Agency ZIP 4 Code	X	4	Last 4 of Zip
18	AG_PHONE	Agency Phone Number	N	10	
19	AG_CASE_NO	Agency Case Number	X	12	
20	AG_ORI	Agency ORI	X	5	
21	AG_FID	Agency FID	X	2	
22	AG_FDID	Agency FDID	X	5	

Arson Juvenile Subject Table (arsonjuvsub.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	SUB_SEQ_NO	Subject Sequence Number	N	3	Key Field
7	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
8	AGE	Age	N	3	
9	GENDER	Gender	C	1	
10	RACE	Race	C	1	
11	ETHNICITY	Ethnicity	C	1	
12	FAM_TYPE	Family Type	C	1	
13	RISK_FACT1	Motivation/Risk Factors #1	C	1	
14	RISK_FACT2	Motivation/Risk Factors #2	C	1	
15	RISK_FACT3	Motivation/Risk Factors #3	C	1	
16	RISK_FACT4	Motivation/Risk Factors #4	C	1	
17	RISK_FACT5	Motivation/Risk Factors #5	C	1	
18	RISK_FACT6	Motivation/Risk Factors #6	C	1	
19	RISK_FACT7	Motivation/Risk Factors #7	C	1	
20	RISK_FACT8	Motivation/Risk Factors #8	C	1	
21	JUV_DISPO	Disposition	C	1	

Fire Department Header Table (fdheader.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	FD_NAME	Fire Department Name	X	30	
4	FD_STR_NO	Fire Department Street Number of Milepost	X	8	
5	FD_STR_PRE	Fire Department Street Prefix	C	2	
6	FD_STREET	Fire Department Street or Highway Name	X	30	
7	FD_STR_TYP	Fire Department Street Type	C	4	
8	FD_STR_SUF	Fire Department Street Suffix	C	2	
9	FD_CITY	Fire Department City	X	20	
10	FD_ZIP	Fire Department Zip	X	9	
11	FD_PHONE	Fire Department Phone	N	10	
12	FD_FAX	Fire Department Fax	N	10	
13	FD_EMAIL	Fire Department E-mail	X	45	
14	FD_FIP_CTY	Fire Department FIPS County Code	X	3	
15	NO_STATION	Number of Stations	N	3	
16	NO_PD_FF	Number of Paid Firefighters	N	4	
17	NO_VOL_FF	Number of Volunteer Firefighters	N	4	
18	NO_VOL_PDC	Number of Volunteer Paid Per Call	N	4	

Code Descriptor Lookup Table (codelookup.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	FIELDID	FIELDID	X	25	Key Field
2	CODE_VALUE	Code Value	C	4	
3	CODE_DESCR	Code Descriptor	X	50	

NFIRS 4.1 Legacy Field Table (legacyfields.dbf)

Field Number	.DBF Field Name	Field Name	Data Type	Length	Comments
1	STATE	Fire Dept. State	C	2	Key Field
2	FDID	Fire Dept. ID	X	5	Key Field
3	INC_DATE	Incident Date	N	8	Key Field (MMDDYYYY)
4	INC_NO	Incident Number	X	7	Key Field
5	EXP_NO	Exposure Number	N	3	Key Field
6	VERSION	NFIRS Data Version	X	5	Data Version (converted 4.1 or 5.0)
7	METH_ALARM	Method of Alarm	C	1	NFIRS 4.1 legacy field
8	METH_EXTIN	Method of Extinguishment	C	1	NFIRS 4.1 legacy field
9	CONST_TYPE	Construction Type	C	1	NFIRS 4.1 legacy field
10	SMOKE_DAM	Extent of Smoke Damage	C	1	NFIRS 4.1 legacy field
11	TYPE_MSMOK	Type Material Generating Most Smoke	C	2	NFIRS 4.1 legacy field
12	FORM_MSMOK	Form of Material Generating Most Smoke	C	2	NFIRS 4.1 legacy field
13	AVE_SMKTRV	Avenue of Smoke Travel	C	1	NFIRS 4.1 legacy field