The Assessor as an Integral Partner in Disaster Planning, Response, and Recovery: 2. Demonstration of an Integrated Damage Assessment Model

By Morgan B. Gilreath, Jr.

This article is the second in a two-part series. Part 1, which appeared in the December issue of Fair & Equitable*, described federal, state, and local roles in disaster response, the types of assistance that are available, and the three forms of damage assessment. This second part describes the Integrated Damage Assessment Model developed by the Volusia County Property Appraiser's Office (Florida). This series is adapted from a presentation given by the author at the 72nd Annual International Conference on Assessment Administration International Concepts, Hometown Applications, Milwaukee, Wisconsin, on October 9, 2006.*

The photo above is of the Friendship Oak, which has endured hurricanes and other events in Mississippi since 1487. A sign next to the tree reads: "I was a sapling when Colombus sailed into the Caribbean and was fully grown by Napolean's reign. I am now over five centuries old. I have sheltered Indians, pirates and college students. I am called Friendship Oak. Those who enter my shadow are supposed to remain friends through all their lifetime no matter where fate may take them in after years. There is not an alumna of Gulf Park College who does not possess, tucked away somewhere among her keepsakes and treasures, a twig, a leaf, or an acorn that came out of my heart. The stairs and platform allow me to invite visitors into my branches without disturbing my leafage. Welcome friends." (photo by Morgan B. Gilreath, Jr.)

FEMA has the only computerized damage assessment model that I'm aware of. It is impressive but is missing some functionality needed for expanded use. Some vendors who perform Detailed Damage Assessment activities as subcontractors of the Federal Emergency Management Agency (FEMA) also have computerized models. None of these models, except FEMA's, however, is available to local governments in an expanded Damage Assessment role. The cost data for FEMA's model were developed by Marshall & Swift, but we were unable to access the cost data in that model for purposes of localizing it. The FEMA model, designed for Detailed Damage Assessment only, requires detailed interior inspections on all aspects of a property's interior finish (separate percentages of damage for interior walls, interior finish, floors, plumbing, electrical, and so on). The FEMA model does not have data descriptions for its database; thus it is very difficult for individual jurisdictions to download property characteristics from an assessor's data file. To make the job easier for the estimator in the field, we decided to write our own system.

Microsoft® Access is perfectly suited for designing and implementing a damage assessment model for local government use. It allowed us to develop, from scratch, a model preloaded with property characteristic data, names, addresses, property class codes, and all the richness already part of an assessor's database. We can preload the entire county (324,000 properties), preload data for the cities, or wait until a disaster occurs and then preload the disaster area designated by the GIS staff. The system itself is presented in detail here, so functional attributes are left out. The system, designed by nonprogrammer personnel, allows for the use of percentages for various levels of damage against construction-cost percentages of total building.

The entire model is transparent. Nothing is hidden; no code is unchangeable; and any process or procedure can be deleted, changed, or enhanced to meet the particular needs of a state or local government jurisdiction. The model was developed for use by Volusia County and its sixteen cities, as well as by neighboring governments. The potential for widespread usage (within Florida) was suggested by Randy Bartell of the Florida Department of Emergency Management (FDEM). Bartell has been at the forefront of the state's efforts in Damage Assessment and says IDAM is the first model of its type to be developed in the state. We are currently working with FDEM to determine whether IDAM can be made more generic and more adaptable. The model presented here is primarily for damage assessment of private and public buildings. We are discussing, conceptually, enhancing the model to include a capability to handle detailed Public Administration Damage Assessment activities as well as a module to assist in mitigation efforts.

The Volusia County Property Appraiser's office had a great deal of experience (22 disasters) prior to 2005, but the five weeks spent in Harrison County, Mississippi (Long Beach, Gulf Port, Biloxi, and Pass Christian) raised us to another level of appreciation for all aspects of the process. When three hurricanes passed through Volusia County in 2004 in nine weeks, we thought we knew something about mass disaster response. After visiting Mississippi, post-Katrina, we learned much more about the process and about the incredible ability of the human spirit to endure and overcome under the most horrendous of physical circumstances and still help others. Long Beach Mayor Billy Skellie, Long Beach Fire Chief George Bass, Harrison County Tax Assessor Tal Flurry, and their staffs were personally affected by Katrina, but were always asking, "What do ya'll need?" "What can we do for you?" It was a humbling experience.

After returning to Florida, we knew that what we used to do, and the way we used to do it, needed revision. We had almost insisted that personnel from our office were best suited to visit the properties, and we had been certain that no one else could estimate value or damage as well as our appraisers. A disaster the size of Katrina, however, is overwhelming to all resources (and those of friends, neighbors, and relatives). The Damage Assessment process needs to ensure consistent and accurate property reviews, but it must be flexible enough to allow for a variety of personnel to be easily trained to perform the function.

Previously we had not encouraged other damage assessment teams from the sixteen cities in the county or even from the county's building department. But at a 2006 Damage Assessment Training Session, I stated, "We have changed our paradigm, our way of thinking, and we welcome you to the damage assessment process. We cannot do this alone and welcome you and your people to the process. Allow us to show you what we've learned and the new model we have prepared for you to take back to your jurisdictions. We will load your models with the properties in your jurisdictions. The model is designed to allow integration of all of your and our data to provide rapid, consistent and accurate reporting up the reporting chain to state and federal agencies."

Additional training sessions have been held, and this working model has been delivered to all sixteen cities. Staff from two other counties and from FDEM have been present. The model is in place for any 2006 disasters and is currently being reviewed by FDEM for possible statewide distribution.

The Integrated Damage Assessment Model

The IDAM offers the possibility for coordination of all three phases of Damage Assessment, so data redundancy from multiple visits to the same property is minimized.

The initial IDAM database is preloaded from the assessor's property characteristic and valuation database. The ease of use of Microscoft Access allows IDAM program manipulation at the user's discretion. Therefore, the cost data loaded into the system can be from the local assessing jurisdiction, recommended by a state agency, or recommended by FEMA. The database illustrated here was loaded

Figure 1. Sample IDAM Screen: Summary of Events

Figure 2. Sample IDAM Screen: Damage Assessment Team Identification

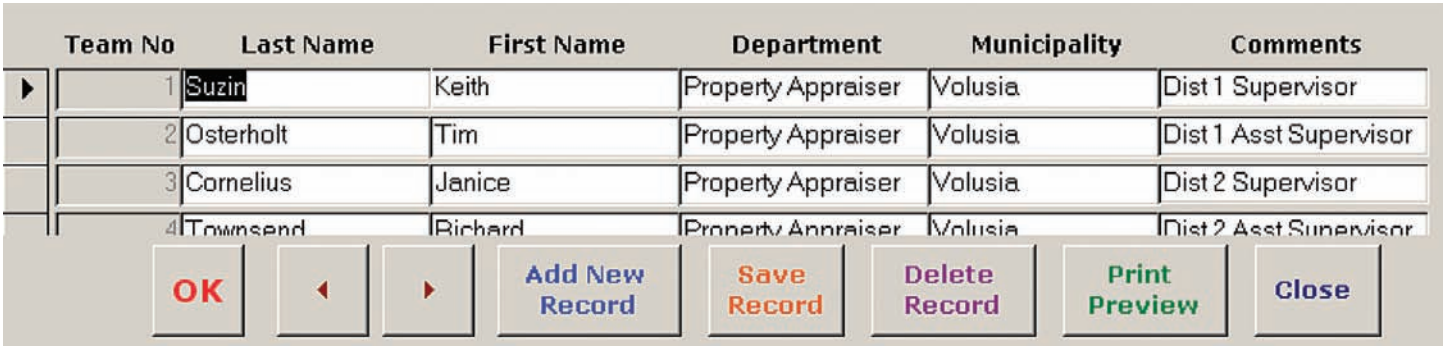
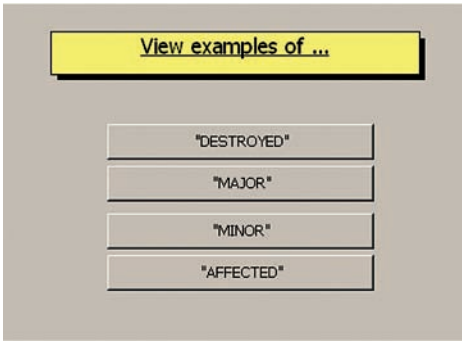


Figure 3. Examples of Damage Assessment Criteria Access Screen



directly from the Volusia County Property Appraiser's computer-assisted mass appraisal (CAMA) system. Florida has a mandated uniform database for county property appraisers so the IDAM should be easily adaptable within the state. Use elsewhere requires only redefining the Access tables to accommodate desired property characteristic and replacement cost new (RCN) data. In other words, the IDAM should be easily adaptable anywhere using the cost-based values determined by the user.

The IDAM database is set up to allow for tracking multiple disaster events over time and reporting damage by single event or cumulatively (figure 1). The system also allows for a *percentage multiplier* in case the RCN data are based on less than 100% of the desired market figures. This also allows adjustment of RCNs for the additional cost of retrofitting an existing structure when repairing damages.

The system then allows definition of the identity of the damage assessment teams (figure 2), so tracking of *who-did-what-when* can easily be accomplished. This could allow for automated work assignments (not part of IDAM at present).

The next step moves directly into the damage assessment of property. There are brief descriptions and pictures of each major category of damage for illustrative purposes (figures 3–6).

The actual input of damage information can be done individually, by neighborhood, or by driving down the street. The street address methodology is probably the most used, since the entire assessor database is already in the system, loaded either by area through GIS iden-

Figure 4. Sample IDAM Screen: Examples of Damage Assessment Criteria—Destroyed

Figure 5. Sample IDAM Screen: Examples of Damage Assessment Criteria—Major

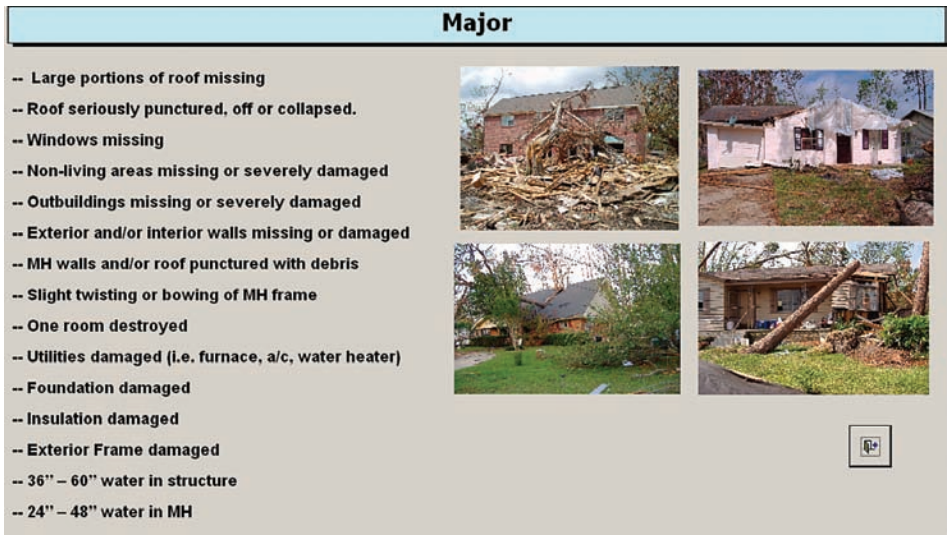
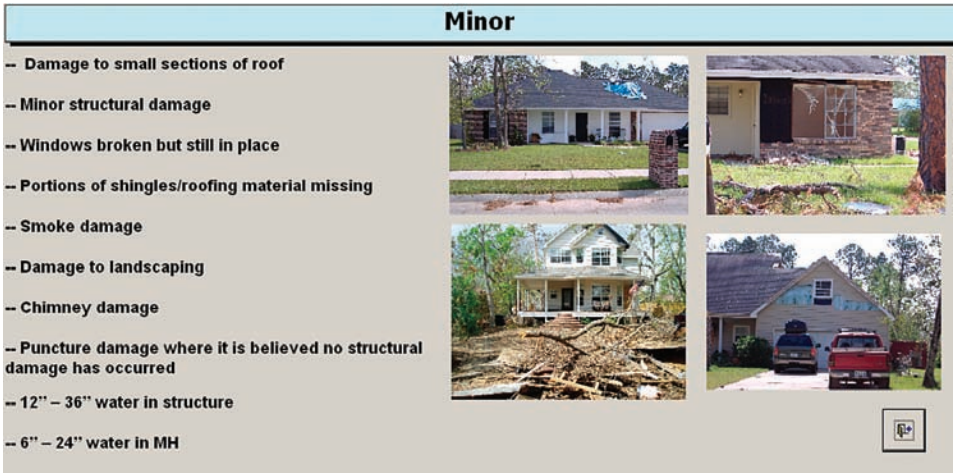


Figure 6. Sample IDAM Screen: Examples of Damage Assessment Criteria—Minor



tification and data load or loaded by already having the entire county database loaded (we've loaded all 324,000 parcels of data into ours). The input option is shown in figure 7.

If the team's damage assessment task is to view property on Westchester Drive in DeLand, Florida, the team would get there as shown in Figure 8.

Then all 53 properties on Westchester Drive in DeLand are shown in a list (figure 9), in which the user can click on one at a time to perform damage assessment at any of the three levels—Disaster Assessment, Initial Damage Assessment, or Detailed Damage Assessment.

Parcels can be selected by clicking anywhere on the parcel record and then on "Go to Individual Damage Assessment Form," which brings up the detail damage input form (figure 10).

FEMA and the Small Business Administration (SBA) want information of the type shown in Figure 10. We plan to add features to allow the model to perform mitigation studies, for which grants and funding are often available. Being actively involved in the mitigation process is a proactive step that once again involves staff positively with the community.

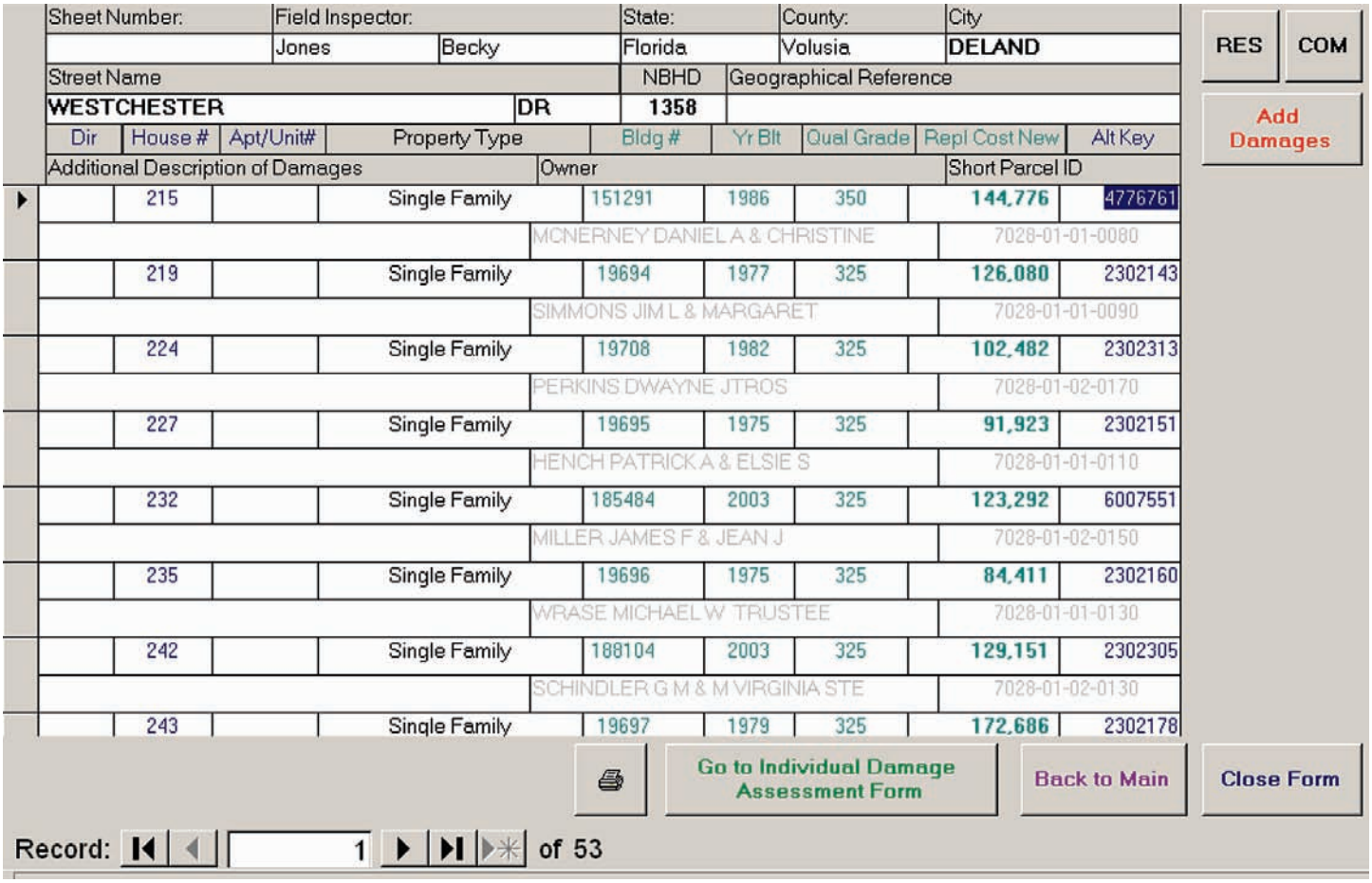
Note that this screen also allows direct viewing, if desired, of the building information figure 11), land information (figure 12), and miscellaneous information (figure 13), as well as the summary of damage information. Digital pictures also can be attached to the parcel damage file.

In a rapid drive-by, the type of detail

Figure 7. Sample IDAM Screen: Parcel Data Retrieval for Damage Input

Figure 8. Sample IDAM Screen: Parcel Location Retrieval

Figure 9. Sample IDAM Screen: Access to Detailed Individual Property Records



shown in figure 11 would rarely be used, but the data are available if needed. The actual recording of damage detail is input as shown in figure 14.

We named this methodology the Harrison County method of recording damage. When we were in Harrison County, Mississippi, after Hurricane Katrina, Tax Assessor Tal Flurry and Chief Deputy Guy Jarmen, came up with an innovative manual input system using basically the same view as in Figure 14. They applied percentages to each damage category allowing each damaged property to fit into a pre-selected range of damage related to the assessor's value. The concept has since been expanded into one that enhances and automates the manual form with the property characteristic, name, address, exemption, and data from the assessor's database into one IDAM, which allows viewing of parcel data, recording of damage (at various levels), and reporting of damage to both individual and corporate levels.

The model also allows each jurisdictional user the option of changing the percentages used for each component area of construction and the percentages applied for each chosen damage level (affected, minor, major, destroyed). A weighted average of damage to the property is calculated by the IDAM and applied to the RCN data stored for the

Figure 10. Sample IDAM Screen: Detail Damage Assessment Form

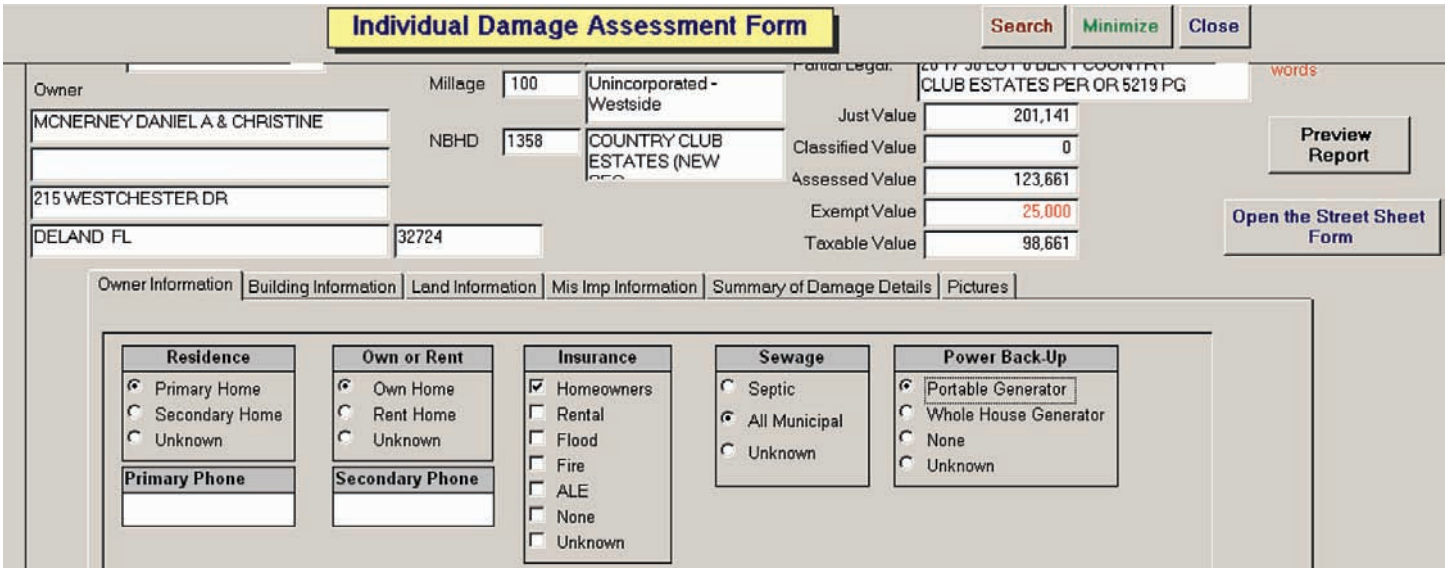


Figure 11. Sample IDAM Screen: Individual Building Information

Bldg Nbr	Improvement Type	Year Built	Quality Grade	Total Area
151291	Single Family	1986	350	2,976

BLDG_NBR 151291

Section Code and Description	# Stories	Construction Type	Section Sq Ft
009 Base Residential Area	1	Brick	2,110
010 Finished Garage	1		520
011 Porch Open Finished	1		5
012 Porch Open Finished	1		341

Foundation	Concrete Slab	
Roof Style & Cover	Hip	Asphalt/Composition Shingl
Heat Method & Source	Forced Air Ducted	Electric
Interior Wall & Floor	Drywall	Carpet

Close

property. All percentages can be adjusted by the system administrator (assessor) to a particular geographic location or construction circumstance. In addition, if the field visit is for Detailed Damage Assessment, another dropdown list allows detailed interior inspection of finish trim, hardware, cabinets/counters, floors, plumbing, electrical, appliances, HVAC, painting, and interior walls.

For the property shown in figure 14, the damage calculated would be viewed as shown in figure 15.

In the IDAM a number of reports (figure 16) are preprogrammed. Because the IDAM is Access-based, these reports are totally flexible and unlimited; a user can modify or enhance existing reports or build additional ones. There also is a detailed individual property damage form, which is like a property record card, showing the primary parcel detail and all damage estimates, along with the names of the data collectors. Individual taxpayers could attach this form to an application to FEMA or to an insurance company as documentation of their damage estimate.

A number of printed reports are available: Summary of Events, Total Count and Estimate of Damage by Muncipality, Summary by Property Type, and Total Damage Estimates by Property Type and Taxing Authority.

Summary

This series presents a concept born out of damage assessment necessities after Hurricane Katrina ravaged the Louisiana and Mississippi Gulf Coast. The concept began as a single printed form (see *F&E* December 2006, p. 8) used in Harrison County, Mississippi.

Figure 12. Sample IDAM Screen: Land Information

LL Key#	Land Use Code & Description		# Units	Unit Type	Land Value
51458	010	IMP SFR TO .5AC PAVD	77.00	FF	54,555

Figure 13. Sample IDAM Screen: Miscellaneous Information

Description	# Units	Unit Type	Year Built	Length	Width	Just Value	Damage
Residential Swimming Pool	450	SF	1995	15	30	7,252	
Patio/Concrete Slab	594	UT	1965	0	0	936	
Screen Enclosure Residential	1044	SF	1965	29	36	2,359	

Record: 1 of 3

Figure 14. Sample IDAM Screen: Damage Evaluation for Primary Structural Components

DAMAGE DETAIL FORM

Save

Date of Inspection: 8/18/2006 Time of Inspection: 9:56 Event Property ID #: 1

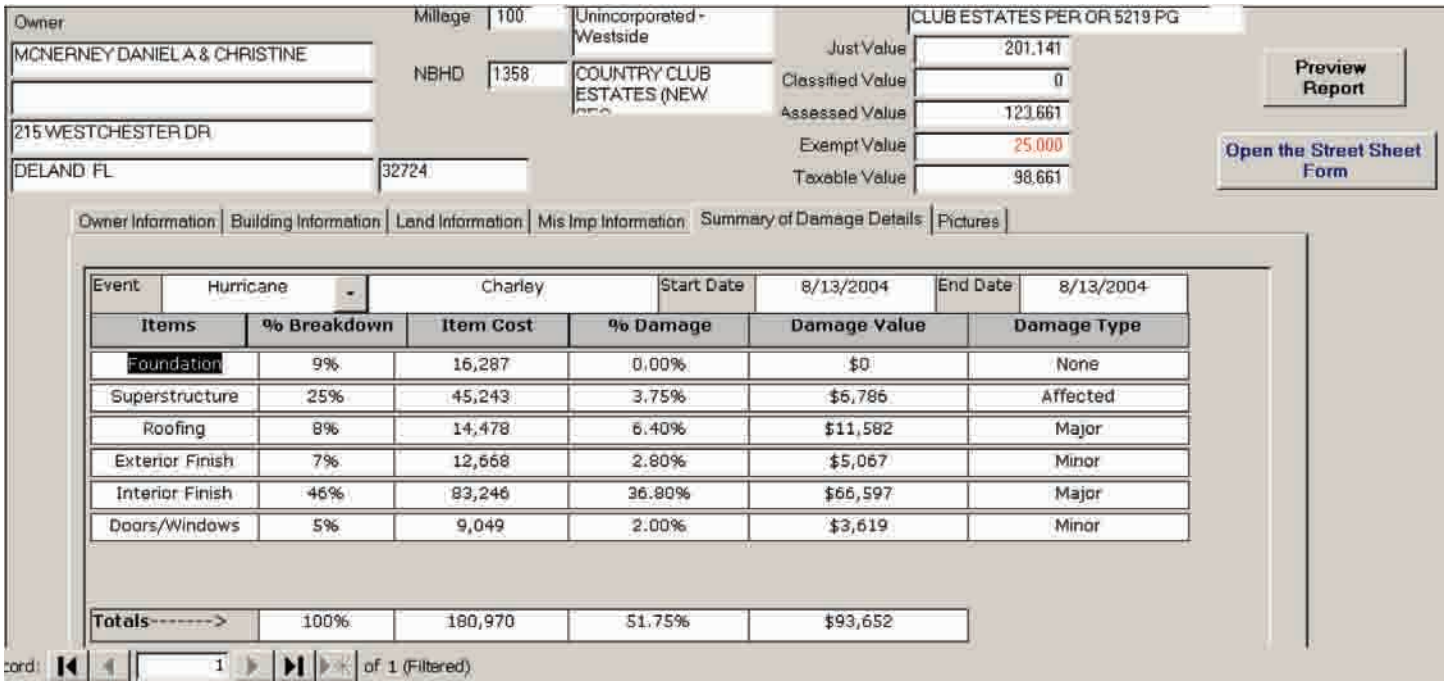
Comments: Tree on house, punctured hole in roof Inspector ID #: 1

Damage Cause: Wind Driven Rain Alt Key: 4776761 Bldg Number: 151291

Building Segment	DamageType ——>	None	Affected	Minor	Major	Destroyed
Foundation		☑	☐	☐	☐	☐
Superstructure		☐	☑	☐	☐	☐
Roofing		☐	☐	☐	☑	☐
Exterior Finish		☐	☐	☑	☐	☐
Interior Finish		☐	☐	☐	☑	☐
Doors/Windows		☐	☐	☑	☐	☐

Record: 6 of 6

Figure 15. Sample IDAM Screen: Detailed Damage Assessment for an Individual Property

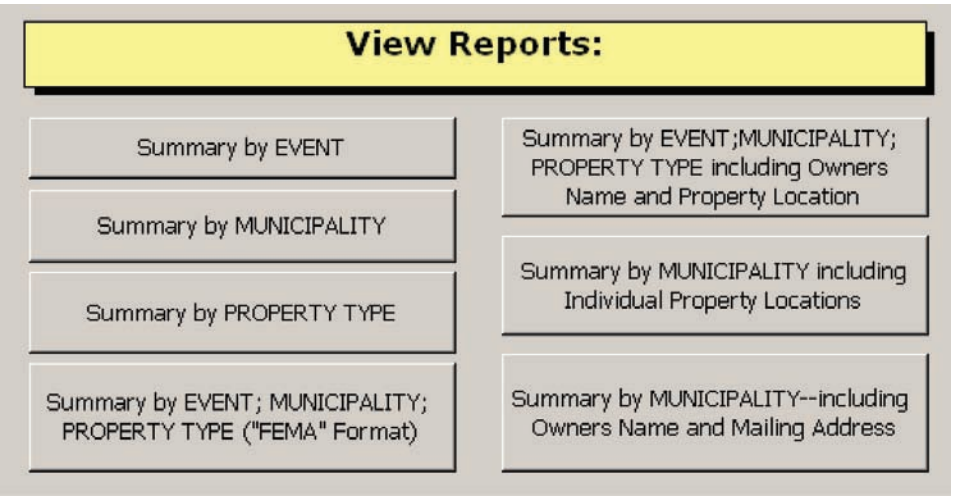


The IDAM presented here allows easy adaptation by any assessing jurisdiction with a property characteristic database. The concept and calculation could be adapted in a Microsoft® Excel spreadsheet or a typed sheet of paper. The model allows for property damage assessment at all three levels—Disaster Assessment, Initial Damage Assessment, and Detailed Damage Assessment. It allows for data continuity, reducing data redundancy throughout the process. Damage assessment field work can be done by the same or totally different personnel, still utilizing all the data filed by previous visitors. The program can be operated on any portable or tablet PC. All data can be consolidated when the damage assessment teams return to home base. The IDAM is comprehensive, allowing for incorporation of detailed property database information, damage estimation on all public and private buildings, and reporting of results.

This series challenges the assessment profession to evaluate the use of its incredibly rich databases, computer talents, GIS/mapping skills, and appraisal knowledge to embrace another level of public service. The Volusia County Property Appraiser's office has found that the IDAM has paid back multiples of effort in good will and positive public exposure.

The Volusia IDAM is available on the 2006 IAAO Conference Proceedings CD and via e-mail through the Volusia County Web site, http://volusia.org/property/, for any jurisdiction to evaluate for adaptation or immediate use. ■

Figure 16. Sample IDAM Screen: Access to Reports



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The author recognizes and thanks Becky Jones, the Microsoft Access expert in the Volusia County Appraiser's Office, for her many contributions to this paper. She also assisted in the conceptual development of the IDAM.