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AUTOCAD FOR ARCHAEOLOGY
A NEW ERA IN ARCHAEOLOGY

We began using the AutoCAD program for archaeological drawings 4 years ago at the Yodefat (Greek: Iotapata) project in Galilee, Israel.

The site of Yodefat is in the lower Galilee and was a fortified settlement during the great revolt of the Jews against the Romans. The city was founded in the Hellenistic era and was destroyed in the summer of 67 AD after resisting a 47 day siege under the leadership of Joshephus (War, III).

Several surveys were conducted at the site to verify its identification with Yodefat. In 1991 excavations begun at the site, under the directorship of Mordechai Aviam from the Israel Antiquities Authority together with Rochester University and have continued until now.

We found fortification remains all around the hill, many cisterns and ritual pools – what we know as Jewish "Mikve" inside the domestic structures. Outside the northern fortifications, and attached to the city wall, we discovered a part of earthworks. This ramp was built by the Romans during the battle in the first century, and yielded bows and catapult arrowheads, ballistra stones and rolling stones. We also found some nails, that apparently came from the Romans soldiers boots.

Because of the bad preservation of the site, we decided to document each layer in detail. We picked for the documentation AutoCAD version 12, with Advanced Modeling Extension (AME).

At the first season we used a survey program application to AutoCAD, for making a topographic map that included all the archeological and the topological information of the survey. This map, helped us to decide were to locate the squares for the digging. The archeological remains were drawn and measured at the site, according to their respective square and then, digitized into the computer (Fig. 1).

The top plans and balks drawings were digitized according to their exact location on the survey map. Each square has an individual drawing, that can also be joined to a general area plan and to a complete site plan. The finds were labeled according to their different types like floors, walls, installations, bedrock etc. This enabled the user to view the remains either according to specific detail or entire information. The ability of CAD program to organize and isolate information on different layer is another beneficial feature. Relationships between objects can be studied very effectively by placing different artifacts and site features on multiple layers. Material can be grouped by date, type – or stratigraphical information, and then be turned on and off in various combination to examine their relationships.

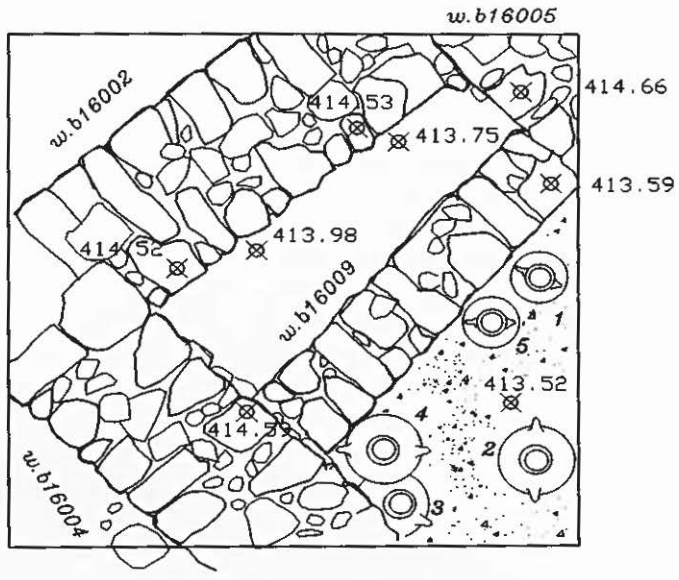

Fig. 1

During the season, the top plans were updated on a daily basis according to the development of the excavation. Each day we plotted a new version of the digging areas and squares. The plotting plans were used for two purposes: one for the area supervisor at the site, and the other for the surveyors to update the area plans.

We also used the AutoCAD program to draw three dimensional section drawings. The sections were entered in different layers. This system enables the user to examine the square either in two or three dimension. In the 3 dimensional (3D) view the user can pick which direction to examine the architectural remains and to study their relationship to the stratigraphical layers.

We can also add to the sections and top plans' drawings the location of the pottery, coinage and other artifacts that were founded on the squares. CAD layering techniques is used to arrange information in chronological order too. Changing can be made without changing the master top plan. This ability to separate different types of graphic information allows archaeologists to create and compare different hypothesis without "contaminating" evidence of actual recorded features.

This system has followed the progress of the excavation and has proved its worth especially in the last season when the volume of information has

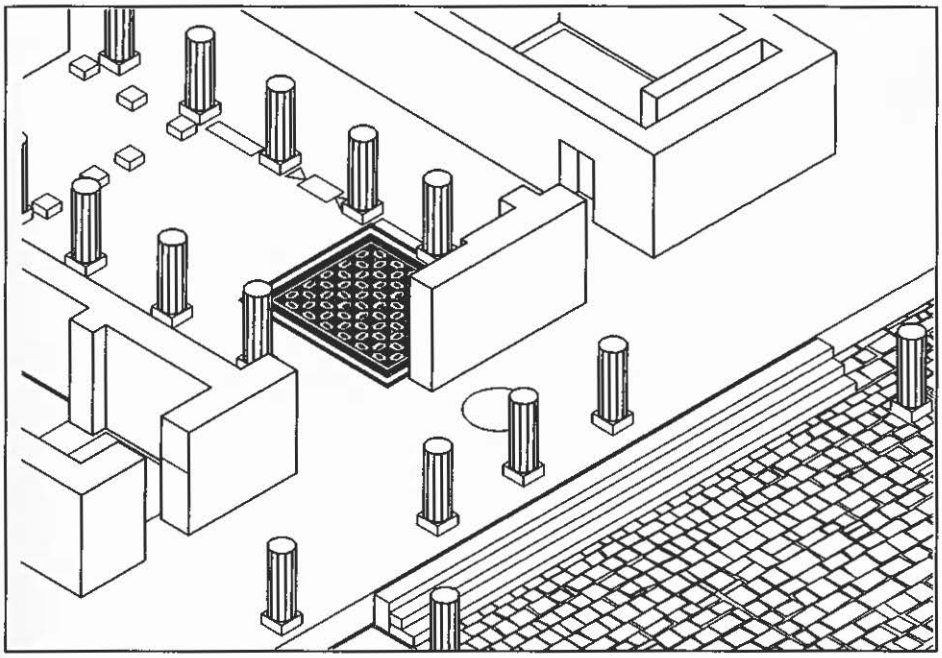

Fig. 2

been enlarged considerably. All the plans and sections from previous seasons were updated easily and quickly with this system.

Other projects in the Galilee region have utilized this graphic system. We have reconstructed for example a church, from the Byzantine period (Fig. 2) using the Auto CAD AME for draw several different reconstruction's on separate layers based on the existing evidence to see which one fit the best.

Some of the drawing of the patterns in the mosaic floor found in the church, were digitized to the computer and then – multiplied as a hatch pattern all around the floor. The dynamic view command, enables us to choose the exact location and the angle of the view for our model. One of the options is to set a camera view, which rotated around the target, changing the distance and freezing the selected point of view. We can also create a rendering animation model that can illustrate the 3 dimensional reconstruction building that we drew. With a color plotting we can plot a photo realistic representation of our model.

The use of AutoCAD for graphic plans in archaeological excavations is still in a beginning stage. The AutoCAD program has proven itself as a valuable and useful tool for archaeological research. Further refinement of the program in cooperation with the parent company will improve its performance and will be more easily applied in more archaeological work.

Besides the dimension and the location database mentioned above, AutoCAD drawing can be used as the foundation of a database of all the information coming out of an archaeological dig. CAD 's ability to keep track of all kinds of information makes this possible.

So far, our drawing system is not fully integrated with the data base programs that we are using – excavation 2001, developed by the Israel Antiquities Authority. We hope that in the future we will be able to improve our system, and make it more accessible for additional archaeological use. This development will be accomplished by future cooperation – between computer programmers and archaeologists.

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ABSTRACT

The paper presents a new method in analysing archaeological data using computer programs – mainly AutoCAD with AME. The method combines recording of archaeological field work (such as survey topographical maps, drawing plans and sections) – with analysing layers, strata and artifacts in 3-D view. It was also used in other projects in this region, mainly for studying large architectural elements. Our method provides a more accurate device, and opens new possibilities in examining current archaeological issues.