Talk about the Application of CAD in Soil and Water Quality Assessment

Jin Chen$^{1,*}$

$^1$Zhejiang Tongji Vocational College of Science and Technology, Hangzhou, Zhejiang, China, 311231

*Corresponding author e-mail: chenjin@zjtongji.edu.cn

Abstract. With the increasing ecological environment problems such as soil erosion and wind and sandification in recent years, mankind has realized the necessity and the importance of protecting the environment, and has begun to study this problem continuously, hoping to find an effective solution to the ecological environment management, so that human development can maintain a balance with nature. In this environment, many disciplines have come into being, and soil and water protection is one of them. Soil erosion (also known as soil erosion) is a global environmental problem, and it is of great significance to control soil erosion as one of the measures to improve the overall ecological environment. "Digital soil and water culture" has become the inevitable trend of the modernization and information development of soil and water, and "computer-aided design technology" as its component is being widely used in soil and water science research, planning, design, construction and management. Therefore, through the analysis of the examples of computer-aided design applied accurately in soil and water protection drawing, this paper aims to further improve and pay attention to the research of the basic technology of "digital soil and water protection", so as to lay the foundation for the comprehensive meeting of the "digital information" society. The computer-aided design has great advantages in the monitoring of large-scale ecological resources and environment, and has the advantages of fast, intuitive and wide monitoring area, so this paper explores the application of computer-aided design in soil and water conservation assessment.

Keywords: CAD, Soil and Water-Based, Assessment

1. Background
In Since the1950s and 1960s, mankind has faced three major crises: population expansion, lack of resources and environmental degradation$^{[1]}$. The ecological environment is becoming more and more prominent, especially the eight major problems, such as global warming, depletion of the ozone layer, acid rain, deterioration of water resources, degradation of soil resources, global forest crisis, biodiversity reduction, pollution of toxic substances and trans-border transfer, are threatening human society. Land is the basis of human existence, and its dynamic change is a direct manifestation of the evolution of natural, social and economic ecological complex systems. Land use/land cover change
LUCC isthe carrier of the most direct and important remains left on Earth by global change. Land use pattern is the result of the long-term interaction between human beings and nature, and all natural forces and human activities will cause LUCC, so LUCC has become a hot and cutting-edge issue in global change research. Research on CAD has been accelerated, and CAD is now playing an increasingly important role in soil and water management assessments[2].

2. Soil erosion
Soil erosion (also known as soil erosion) is the main cause of the degradation and loss of land resources on which human beings depend and is becoming increasingly scarce, and has become a global environmental problem. Severe soil erosion not only destroys land resources and silts rivers and causes flood disasters, but also pollutes water quality and destroys water resources[3]. Both developing and developed countries have been affected to some extent by this problem in their economic development. China is one of the most serious soil erosion countries in the world, soil erosion is widely distributed, large area, the total amount of soil lost each year is about 5 billion tons, soil erosion types are complex and diverse. According to the results of China's second soil erosion remote sensing survey recently released, China is currently affected by water erosion of an area of 3.67 million square kilometers, accounting for more than 1/3 of the total land area, China's number one environmental problem. And according to the survey: China's soil erosion area is still increasing the development trend. Soil erosion has caused a series of serious consequences, such as soil barrenness, mudslides, river silting, frequent natural disasters, fragile ecosystem, etc. which directly lead to the deterioration of the human environment, regional poverty and social backwardness, and has become one of the important factors restricting the sustainable development of China's national economy.

3. Water conservation
When soil erosion is caused by man-made factors and natural factors, the means to prevent and control it are soil and water conservation[4]. This means over time, one is in the process of improvement and optimization. Until the 1980s, has been transformed into the form of small sea management, opened a new model of soil erosion management, a small, watershed is a separate natural water collection cell, the time or agriculture and forestry formed economic cells, in the process of soil erosion and governance there is a certain law. As far as the overall situation of our country is concerned, the soil and water protection area in China is relatively large, and the situation is more complex, there are problems in theory, practice and social science. Not only to the ecological environment to pay sufficient attention to, but also to consider the existing legal law, the most extremely re-examined discipline.

4. The application of CAD in soil and water quality assessment

4.1. Draw the basemap
Before carrying out the water and soil protection construction management plan for the small basin, the design basemap is scanned proportionally by the scanner, the scanning picture is redrawn with CAD software, the CAD basemap is formed, and then it can be arranged and planned on the CAD basemap. According to the analysis of soil and water loss causes and the need to calculate the amount of loss, the basic conditions such as topography, slope, slope length, rainfall, wind, vegetation coverage, soil, existing water protection facilities, etc. should be given through investigation and calculation, the type of soil erosion, the cause (wind, hydropower, gravity, etc.), the erosion module, erosion intensity, soil loss, the amount of water protection facilities that may be lost by the project. (The test point of soil erosion is the content of soil erosion investigation, and the result of the investigation, as well as the prediction and calculation results.).
4.2. Determine the plot
According to the requirements of the General Principles of Integrated Water and Soil Conservation Management Planning (GB/T 15772-1995), combined with the land use status quo in small basins, the plots with different status quo are drawn to the planning base map. At the same time, the survey of the landform, slope, vegetation soil erosion and other categories and levels of land use, and land use status quo is the same, and landform, slope, vegetation, soil, erosion of different types of plots, according to its dividing line will be the land use status quo map split, forming a planning map class.

4.3. Use a computer-aided design to extract the area
The traditional method of drawing the spot area is to use several squares or a product gauge, which not only has a large error in the measurement results, but also has a large rate of repetition and high working intensity. Using the Area option in the Query command under the Tools menu in CAD mapping software, the area of the spot can be easily measured along the boundary point of the map, and the denser the spot drawing, the more accurate the area taken, and the accuracy of the measured area can reach 100% for the geometry of the rule. For example, the following figure irregular parcel, to take the amount of the plot area, if the plot is a closed curve, you can directly select the "tool" menu under the "query" command in the "area" option, in the command window to enter the object "o", and then in the curve to select a point, you can accurately get the amount of the plot area. If the parcel is not a closed curve drawn with a styling curve or a multi-segment line, you can easily draw the approximate area of the parcel by using the Area option in the Query command under the Tools menu and the red dot drawing along the boundary.

| The problem of drawing normalization | The common problems                                      |
|-------------------------------------|----------------------------------------------------------|
| The composition of the drawings     | The drawings are incomplete                               |
| Terms and symbols                   | Structural chart lines do not conform to the regulations |
| Schema                              | Sections, sections, and section views are indestinct     |
| Legend                              | There are often mistakes in the way drains are drawn to block slag walls (or retaining walls) |

5. Conclusion
With the continuous growth of national investment in soil and water conservancy and the full integration of water and soil protection projects into the management of water conservancy projects, higher requirements have been put forward for the planning and design of small watersheds, improving the quality and accuracy of design, and ensuring that the location, area, boundary and field correspondence of the implementation measures are the new requirements for the planning and design
of small watersheds at this stage[6]. At the same time, with the progress of science and technology, project fine management to map has become a trend, in order to reduce the management level, improve management efficiency, promote project management information, but also need to be based on detailed and accurate small watershed planning and design[7]. The use of CAD to take and determine the area of water and soil to maintain small basin map plots not only improves the accuracy and accuracy of the identified map plot area, but also greatly reduces the workload of designers, and robs time for the timely completion of ecological construction management planning for small basins.

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