You can cut on-course waiting time

A computer program can now provide alternatives, without eliminating any holes, to speed up play on existing or unconstructed courses

by Donald B. Cook

Is your course one of those that's beautiful to look at but frustrating to play because of excessive on-course waiting time?

If so, there is something that can be done about it!

With almost every business today finding some sort of use from a computer, golf now finds itself no exception. Although it's realized that several characteristics such as aesthetic beauty, golfing challenge, construction and operation costs, and safety must also be considered in golf course design, smoothness of play (waiting time) cannot be underrated. A program called GCS (Golf Course Simulator) has been designed to provide assistance in areas of complex waiting situations.

In computer terminology, a golf course is considered to be a "complex feedback network." In layman's terms this simply means that what happens on the 17th hole to the 20th foursome of the day may well affect what will happen on the 2nd hole to the 30th foursome. Through the use of feedback network analysis, the GCS computer program was specifically designed to predict waiting time characteristics for any golf course either *prior to actual construction or for alteration of existing courses.*

It should be noted that similar to most complex scientific analyses, certain assumptions are required to stay within economically feasible costs of solution. Two of the more important assumptions of the GCS program are:

(1) *The standard playing group is a foursome*—This is a realistic assumption since a foursome is the normal playing group required during peak periods on the course.

(2) *The course is being played under maximum utilization*—Assuming of peak conditions is quite logical since in any waiting time problem the most critical period, naturally, is when a facility is under maximum capacity.

By now you may be wondering just what kind of information must be supplied to the computer, and how the computer can possibly account for the great variation in the playing speeds of different golfers. First of all, times have been collected for the various golfer playing elements. Over two hundred times were obtained by actual stopwatch studies on various courses for elements such as hitting the ball from the tee, walking, putting, etc. Ranges of time, rather than any one specific figure, were calculated for elements such as putting, where there is a high degree of variation among different golfers. This time data is given to the computer and the computer is programmed to randomly select specific times that fall within the given ranges. Using a random selection from a range of values, rather than one specific figure, permits the computer to simulate the time variability caused by different golfer playing speeds.

To complete the data required by the computer, the architect must supply certain key characteristics for each specific course design. The major areas of information are readily accessible to the architect and center around hole sequence and layout, playing distance and unusual features, and distance between each green and the following tee. The actual architectural data sheet is shown in Exhibit I (below).

Only one item in the chart calls

GCS ARCHITECTURAL DATA SHEET

Architect: _____ Course: _____ Alternative: _____ Date: _____

Hole Design						
Hole No.	Par	Dist.-Yds.	Difficulty	Upgrade	Conveyance	Office Use
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						

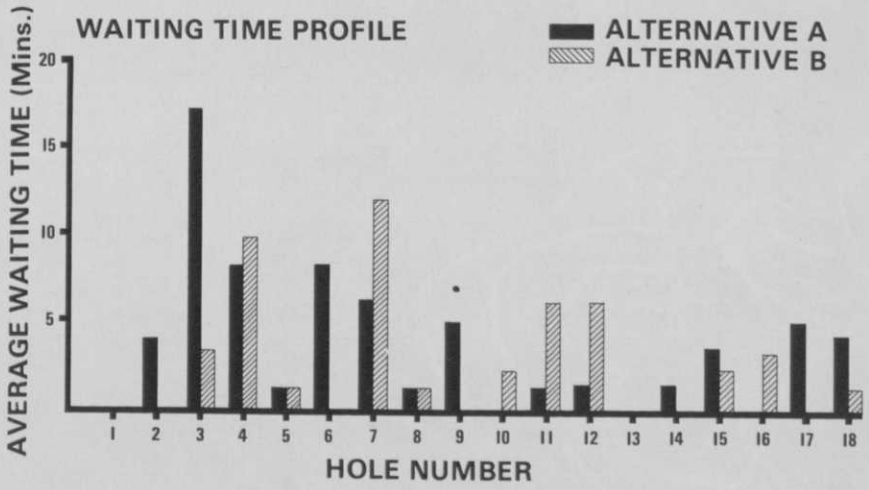
Walking Between Holes					
From-To	Dist.-Yds.	Stopover	Upgrade	Conveyance	Office Use
First Tee	XXX	XXX	XXX	XXX	XXX
1-2					
2-3					
3-4					
4-5					
5-6					
6-7					
7-8					
8-9					
9-10					
10-11					
11-12					
12-13					
13-14					
14-15					
15-16					
16-17					
17-18					

Additional Remarks:

Stopover column is to identify rest rooms, refreshment stands, etc., located between a green and the following tee. In courses not yet built, the GCS will indicate where these items should be built. Difficulty column calls for a subjective opinion. Architect must classify each hole as 1) normally difficult, 2) very difficult, 3) extremely difficult, based on time, not par. (Exhibit I).

for an opinion. Everything else is factual. The difficulty of each hole must be classified by the architect as: (1) normally difficult, (2) very difficult, (3) extremely or unusually difficult. The term difficulty is to be taken to mean *difficulty in completing a hole within the normal playing time, rather than difficulty in scoring par.* Since searching for lost balls is one of the most time-consuming elements on the golf course, a rough guideline for the difficulty classification is as follows:

(Assume a foursome who members play to a 20-25 handicap:)



In this bar graph (Exhibit II) Alternatives A and B represent waiting times for the same course. In the latter case, the holes were played in a different order. Wherever there is no bar for a hole, there was no waiting time.

(1) normally difficult: under normal conditions *no* member of the group would be expected to lose a ball or go out of bounds,

(2) very difficult: under normal conditions *one* member of the group would be expected to lose a ball or go out of bounds,

(3) extremely difficult: under normal conditions *more than one* member of the group could be expected to lose a ball or go out of bounds.

Most courses will only consist of number (1) and (2) holes. In a very unusual situation a type (3) may be encountered.

Through the use of the predetermined golfing time ranges and the information provided by the architect, GCS simulates five days of actual golf play under maximum course utilization for any normal golf course design. The results are tabulated and summarized in layman's terms in the form of a report complete with graphic exhibits. Using this information, the architect can compare smoothness of play for various alternative layouts of the same course and in time, after he has accumulated a library of reports, he can make cross comparisons between his new design and those he has already had constructed.

It should be emphasized that the program *does not* redesign the course or explain why the course will have the reported waiting time characteristics. The redesign is the responsibility of the architect and the final acceptance that the course will play smoothly is between the architect and the owner.

Now that we have gone through the workings of GCS, perhaps the best way to further explain the program is to show the partial results of a sample application. In this example, an existing course was used in order that the simulation results could be verified by referring back to the actual course. (However, the input information required by the computer would have been available even if the course were still on the drawing board). Using the actual course data for Alternative A and the same holes played in a different order for Alternative B, the GCS program developed the following information:

	Alt. A	Alt. B
Average waiting time per foursome	65 mins.	47 mins.
Maximum waiting time (hole-time)	3-44 mins.	7-33 mins.
Average course time per foursome	305 mins.	287 mins.
Completion time for 50 groups to complete 18 holes	728 mins.	712 mins.
12 Hr. course capacity (assume all groups play 18 holes)	49 Grps.	51 Grps.

In the case above it is quite simple to come to the conclusion that Alternative (B) is a smoother playing course design than Alternative (A), since it is superior in all of the above characteristics. Several other samples, however, have proven to be more complex than the above example.

It is quite possible, for instance, to have less waiting time per foursome and yet a lower course capacity. This is particularly true where the first hole slows down the entry of foursomes on the course; thus spreading the groups so far apart that the course is being under-utilized. It is also feasible to have a higher maximum waiting in one location and yet less average waiting for the entire course if most of the waiting is being consolidated at a single hole.

In addition to the summary data shown above, three graphs are included in each GCS report. These graphs include the following information:

(1) Course time per foursome for 50 foursomes,

(2) Group finishing times for 1 through 50 foursomes,

(3) The location and duration of waiting times.

The accompanying graph, called the Waiting Time Profile (Exhibit II), shows each hole for Alternatives A and B of our sample project. This type of graph can be extremely helpful to the clever architect as he improves his course design or attempts to improve an

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existing course through alterations.

For example, in the graph the high waiting time for Alternative A at the third hole could most likely be reduced by increasing the difficulty or length of holes 1 and 2 and decreasing the difficulty of hole 3. (It is interesting to note that hole 3 on the existing course had a difficulty classification of 3 due to a narrow fairway and a blind tee shot).

The architect must be careful, however, that the changes he makes on the first three holes actually reduce the waiting rather than transferring it to another hole further up the line. He can guard against this by checking his revised design with the GCS program. Incidentally, upon completion of the above example, the results for Alternative A were verified by comparing the simulated figures to the actual course conditions, and the correlation between the computer world and the real golf world was found to be extremely close.

The GCS program was introduced recently to several architects for their opinions. Some feel that the program is useful for public courses, but limited memberships reduce its need at private clubs. Contrary to this opinion, the author believes that almost all courses have peak traffic periods and that the high cost of private club memberships should mean that, though it may not be as crowded at peak periods, private club members have the right to play a course where smoothness of play has been considered.

Another comment often heard from the architects was that they already can tell how smooth a course will play before it is constructed. Perhaps the architect can tell where some major delays will occur, but it would be impossible to intuitively give a valid *quantified* answer as to how much waiting time will be encountered and where that waiting time will occur on a proposed course.

As you can surmise, the GCS program is extremely simple for architects, or possibly course owners, to use.

(1) Provide a layout sketch or drawing and fill out an Architectural Data Sheet,

(2) Calculate the analysis cost and complete the order form,

(3) Forward the above documents with a check covering the cost.

It usually takes approximately two weeks to receive an answer. Naturally, each report is strictly confidential and the sole property of the client. It must be re-emphasized, however, that the program *does not design golf courses.* It merely gives quantitative data for use in evaluating on-course waiting times. □

About the author—Donald B. Cook is president of Donald B. Cook & Associates, management consultants specializing in industrial engineering studies in areas such as systems design, facilities evaluation, and plant and office layout. He holds a Bachelor of Science degree in Industrial Engineering from Rutgers University and a Masters in Business Administration from the University of Washington.