

# Machine-Readable Files for Serials Management: An Optimizing Program and Use Data

Maurita Peterson Holland

The unending battle to balance the serials budget within the larger information resources budget has provoked much thought (and many faculty members!). All too frequently the subjective measure of serials "value" is applied by librarians or faculty. This is done either by the librarian and serials personnel subjectively ranking the relative (perceived) worth of titles (value = rank) or surveying students and faculty, allowing them to make subjective evaluations of titles. There are, however, also some objective measures of value that may be employed. These include measuring value by the proportion of time a title spends off the shelf (sample shelves at random times, continue sampling until a sufficient database is established), by surveying students and faculty, inquiring which titles they use and how frequently, or by tallying the frequency with which a title is used (i.e., uses/year). In an earlier article<sup>1</sup> a formula was presented, based on use and patron access time, which measures the effect of serials budget reductions on public service. The files of data created in order to apply that formula can also be used for other kinds of objective serials budget analyses. Here we will describe such analyses and present their application in a large engineering collection.

## SERIALS CLASSIFICATION AND DATA COLLECTION

Most serials collections can be classified as shown in figure 1. In an ongoing data collection process for all serials, use both within the library and through circulation is tallied as the items are reshelved. For

each of the components of the serials collection, we then create machine-readable files which provide management information. Data elements are: title, years of subscription if a non-current title, language if non-English, unbound and bound use, call number, cost.

The classification of serials, also considered data files, with description of file contents and action, is given below:

*Non-Current Titles (dead or canceled):* Action—collect data, sort by usage, consider resubscribing to those with high usage, storing those with low use.

*Current, Non-Free Titles:* Action—collect data, (1) sort by "density," obtain an optimal list of titles for budget (2) sort by subject, then by use or "density" within each area.

*Current Free Titles:* Action—collect data, sort by usage, cut those with minimal usage if space is a consideration.

*Recently Acquired Titles:* Action—collect data for a few years before considering as "current, non-free" titles, make subjective cuts as felt necessary.

*"Sacred Cows" (titles which the library "must" have):* Action—don't touch "sacred cows."

Because current, non-free titles are the prime target for serials reductions, we will consider action both on the optimal list and the use sort by subject.

## OPTIMAL LIST

Using a heuristic device that generates feasible solution to a special type of integer programming problem known as the "knapsack" problem, we perform the following:

1. Establish a value for each item (title)

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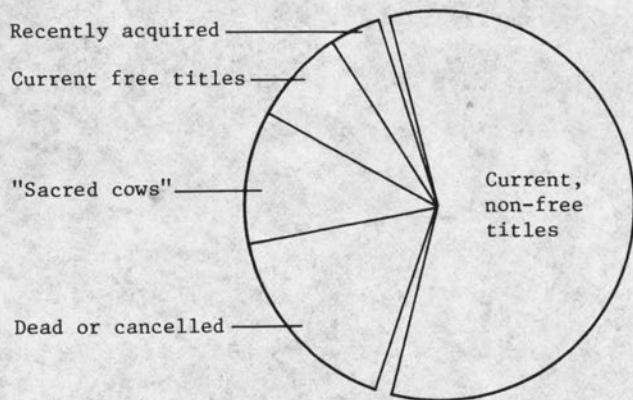


FIGURE 1  
Serials Collection Classification

in the problem (value is defined here as the average number of unbound uses per year per title).

2. Divide this *value* by the cost for each title, giving value/dollar/title = density:

$$\text{density} = \frac{\text{value}}{\text{cost}}$$

3. Sort the collection of current, non-free titles in descending order using the density obtained above. By generating a list of titles, sorted by density, it is possible to obtain an optimal list of titles for any desired budget. Such a list might appear as follows:

Title	Cost	Budget	Density
GGG	$C_1$	$C_1$	27
MMM	$C_2$	$C_1 + C_2$	22
.	.	.	.
.	.	.	.
BBB	$C_n$	$\sum_{i=1}^n C_i$	.5

To obtain an optimal list, one reads down the list until reaching the appropriate budget. The titles above that point comprise the optimal list.

Applying this procedure to our own data, we created a machine-readable file of all serials titles in our collection which have received one or more uses in the last five years (1,700 titles) and sorted on the current, non-free files. (See figure 2.)

Fifty percent of our use was met by 114 of the 1,092 titles in the current, non-free title including several titles new during the past five years. (*Interface Age*, two years; *Petroleum Engineering International*, three years . . .)

### Observations

The optimal list ranks the low-cost, high-use volumes near the top of the list. In engineering, this includes titles the research faculty may prefer not to have support such as *Creative Computing*, *Motor Trend*, *Byte*, *Aviation Week and Space Technology*, etc. If these titles are important for non-research use in the library, they could be defined as "sacred cows" and thus removed from the file; more typically, however, the "sacred cows" are those titles representing scholarly proceedings and transactions from professional societies. More than half of the titles which were in the lowest 10 percent of use were new during the last one to four years. It is possible that a combination of low faculty/student awareness of the title, and an indexing lag or lack thereof, accounts for their low use. Therefore, we decided to exempt most new subscriptions from cancellation for five years.

### USE BY SUBJECT

A list of titles is generated by engineering discipline. Each list is subarranged by use, based on 1976-81 use data; the earli-

TITLE	CALL NO.	DENSITY	BUDGET	SERVICE%
Civil Engineering	TA1	19.85	\$7.00	1.07%
ACM	QA 76	12.66	\$10.00	1.36%
Interface Age	QA75	12.50	\$22.00	1.82%
Engin. News Record	TA 1	12.47	\$45.00	4.04%
Petroleum Engin. Int'l	TN 860	11.66	\$51.00	4.36%
.	.	.	.	.
Warme und Stoffuber	QC 251	0.02	\$40,162.00	95.55%
Soil Mechanics & Foundation Engin.	TA 710	0.02	\$40,437.00	95.60%
Rail International	TP 2	0.02	\$40,508.00	95.60%
Polymer Science USSR	TP986	0.02	\$40,888.00	95.67%

FIGURE 2  
Example of File

						Aver. bd. and unbound use*
<i>CHEMICAL ENGINEERING</i>						
Chemical and Engineering News						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TP 1	306	
208/89	150/115	\$8.00	\$40.00			
Chemical Engineering Progress						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TP 1	230	
109/97	100/129	\$75.00	\$100.00			
Hydrocarbon Processing						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TP 692	228	
57/129	69/158	\$4.00	\$7.00			
AICHe Journal						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TP 1	210	
82/137	22/119	\$75.00	\$100.00			
Management Science						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	HD 28	202	
58/142	30/62	\$32.00	\$50.00			
<i>CIVIL ENGINEERING</i>						
Engineering News Record.						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TA 1	500	
389/123	330/177	\$12.00	\$23.00			
Civil Engineering (ASCE)						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TA 1	232	
142/57	112/73	\$7.00	\$7.00			
American Concrete Institute. Journal.						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TA 680	150	
57/78	16/68	\$11.00	\$25.00			
ASCE Structural Division Journal						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TA 1	138	
28/106	6/127	\$7.00	\$15.00			
Journal of Materials Science.						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	TA 401	114	
105/53	23/88	\$191.00	\$436.00			
<i>NAVAL ENGINEERING</i>						
Yachting.						
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	VM 320	210	
0/137	79/111	\$10.00	\$15.00			

\*This figure is calculated over five years data in file, not just on the two printed out.

FIGURE 3  
Example of File

Shipping World & Shipbuilder. Reserve.					
1975/76 UB/B	1980/81 UB/B	1976 Price	1981 Price	VM 1	156
60/70	101/78	\$26.00	\$58.00		
Motor Ship. London.					
1975/76 UB/B	1981 UB/B	1976 Price	1981 Price	VM 1	130
82/55	45/67	\$16.00	\$48.00		
Shipbuilding and Marine Engineering International.					
1975/76 UB/B	1981 UB/B	1976 Price	1981 Price	VM 1	116
121/8	103/17	\$14.00	\$40.00		
US Naval Institute. Proceedings.					
1975/76 UB/B	1981 UB/B	1976 Price	1981 Price	V 1	112
92/15	47/47	\$0.00	\$0.00		

FIGURE 3, CONTINUED  
Example of File

est and most recent prices are printed out. (See figure 3.) This file is especially useful in discussion with faculty and in facilitating departmental input on cancellation decisions.

#### FURTHER USES

The serials file in machine-readable form has many other uses. For example, the subject file aids in maintaining balance by discipline throughout the collection when cutting the serials budget.

Public service uses are especially important. Our reference librarians use the data to point out most-used titles in a particular subject discipline as students come in with the assignment to become familiar with literature in their field. A new user education tool is created when the file is enhanced by the addition of the indexing or

abstracting tool for each title. Also included is information on which titles can be searched online through the use of DIALOG, Orbit, BRS, etc. Another enhancement is the special issue information, such as "January issue includes product directory."

#### SERIALS MANAGEMENT

No single list or algorithm will resolve all problems in the complex effort to provide the greatest number of patrons the most convenient access to the serial literature they require within allotted budget. However, applying our public service formula of 1976 and creating the optimizing program and discipline use sort provides objective information that can aid judicious decision making.

#### REFERENCE

1. Maurita Peterson Holland, "Serials Cuts vs. Public Service: A Formula," *College & Research Libraries* 37:543-48 (Nov. 1976).



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