

Paper: 308-2013

## A Simple Approach to Generate Page Numbers in X of Y Format in ODS RTF Output

Amos Shu, Endo Pharmaceuticals., Chadds Ford, PA

### ABSTRACT

Page numbers in X of Y format, such as “Page 18 of 280”, “Page 2 of 30”, are a common feature of ODS RTF outputs. The “X” indicates the current page number, and the “Y” is the total number of pages. There are some macros available to generate those numbers, but they are not easy to use<sup>[1, 2]</sup>. SAS itself does not have any functions to do real page count. Instead, SAS borrows Microsoft Word processors to compute those numbers and put them in the final output by using TITLE or FOOTNOTE statements with “{page {field{fldinst{page}}} of {field{fldinst{numpages}}}}” or “Page ~{thispage} of ~{lastpage}”. However, the page numbers generated by Microsoft Word processors contain field code information displayed as “Page {PAGE \\*MERGEFORMAT} of {NUMPAGES \\*MERGEFORMAT}” rather than the page numbers when Alt - F9 keys are pressed. Some users of the RTF outputs such as medical writers do not like such field code information associated with the numbers, because the values of the page numbers would update when inserted into another document such as Clinical Study Report. This paper discusses a simple way to generate page numbers in X of Y format in ODS RTF output with the PROC REPORT procedure.

### INTRODUCTION

SAS uses TITLE or FOOTNOTE statements with “{page {field{fldinst{page}}} of {field{fldinst{numpages}}}}” or “Page ~{thispage} of ~{lastpage}”, which actually are Microsoft Word processor functions, to compute page numbers in X of Y format, such as “Page 18 of 280”, “Page 2 of 30”, in ODS RTF outputs. Behind the page numbers generated by Microsoft Word processors, there are some Word field code associated, which displayed as “Page {PAGE \\*MERGEFORMAT} of {NUMPAGES \\*MERGEFORMAT}” instead of the page number when Alt - F9 keys are pressed. Some users such as Medical writers do not like this, because the values of the page numbers would update when inserted into another document such as Clinical Study Report. There are some macros available to generate those numbers, but they are not easy to use<sup>[1, 2]</sup>. This paper discusses a simple and easy way to generate page numbers in X of Y format in ODS RTF output.

All programs presented in this paper were developed on Server SAS 9.2 in the Windows environment.

### STEP 1. CREATE A PAGE VARIABLE IN THE FINAL DATASET BEFORE USING THE PROC REPORT PROCEDURE

A numeric variable containing page number values will be used in the PROC REPORT procedure to generate Page X of Y. To get page number values, first you have to figure out what is the maximum number of rows each page body (excluding title, footnote, and free margin space areas) can contain. The best way to get this number is to use the PROC REPORT procedure to test it. In theory, if there are no wrapped columns, no blank rows, and assuming that each observation occupies only one row in the output, the total number of pages should be equal to the number of total rows divided by the maximum row number of a page if there is no remainder, or to that value +1 if there is a remainder. However, almost every RTF output contains blank rows at least for cosmetic purposes. Some RTF outputs such as most of listings have wrapped columns, which means that one single observation in the SAS dataset could be displayed in multiple rows depending on the maximum length of the variable in that observation. As a result, how many rows each page contains will vary. This makes the job to create page numbers much more complicated.

The following three steps have been developed to get the page number:

- 1). Get the number of wraps for each wrapped column with the CEIL and LENGTH functions.

$$\text{wrap}_x = \text{CEIL}(\text{LENGTH}(\text{col}_x) / N_x) ;$$

$\text{wrap}_x$  stands for the number of wraps for column x.

$\text{Col}_x$  stands for column x.

$N_x$  stands for the maximum number of characters column x can have. For example, if column x is 35 characters long, then replace  $N_x$  with 35.

- 2). Find out the maximum wrap count with the MAX function:

$$\text{maxwrap} = \text{MAX}(\text{wrap}_1, \text{wrap}_2, , \dots) ;$$

3). Calculate the page number.

```
DATA fin;
  SET xyz ;
  BY sitesubj ;
  RETAIN pg 0 pgcnt 0 ;
  IF FIRST.sitesubj THEN pgcnt = pgcnt + maxwrap + 1 ;
  ELSE pgcnt = pgcnt + maxwrap ;
  IF pgcnt > pnum THEN DO;
    Pgcnt = maxwrap + 1;
    Pg = pg + 1;
  END;
RUN;
```

pg is the page number variable.

pnum stands for the maximum number of rows that each page body can contain. For example, if the maximum row number that each page body can contain is 30, then replace pnum with 30.

## STEP 2. CREATE A MACRO VARIABLE THAT CARRIES A VALUE FOR THE TOTAL NUMBER OF PAGES

The PROC SQL procedure can be used to create a macro variable - &tpg that carries the maximum number of pages:

```
PROC SQL NOPRINT;
  SELECT max(pg) into :tpg
  FROM fin ;
QUIT;
```

## STEP 3. GENERATE PAGE NUMBERS IN X of Y FORMAT IN ODS RTF OUTPUTS

The following macro generates RTF output.

```
ODS RTF FILE = "xyz.rtf" ;
%MACRO Rept ;
  %DO i = 1 %to &tpg ;
    TITLE1 J=L "xyz Inc." J=C "Confidential" J=R "Page &i of &tpg" ;

    PROC REPORT DATA = fin (where=(pg= &i)) missing nowd headline headskip;
      COLUMN pg col01 col02 col03 col04 ;

      DEFINE pg / order order=internal noprint ;
      DEFINE col01 / ... ;
      .....
      BREAK after pg / page ;
    RUN ;
  %END ;
%MEND;

%Rept ;

ODS RTF CLOSE ;
```

## CONCLUSION

SAS's position on RTF is that the format is intended for modification. However, this is not the case for drug submission. Once the final batch run is finished, the outputs are not supposed to be modified any more. The approach to generate page numbers in X of Y format as discussed above is straightforward without having to deal with the Microsoft Word field code information. A drawback is that the number of rows in each page may not be even. Some pages may contain more rows with less white space whereas other pages may have more white space. However, the benefits outweigh the drawbacks.

**ACKNOWLEDGEMENTS**

A Special thanks to Catherine Smolens for her help.

**REFERENCES**

[1]. Felty, Kelly, *The Power of PAGEOF (A Valuable Page Numbering Macro)*, SAS Users Group International 24, 1999

[2]. Chung, Chang, *Page X of Y with Proc Report*, PharmaSUG, 2004

**CONTACT INFORMATION**

Your comments and questions are valued and encouraged. Please contact the author at:

Amos Shu

Endo Pharmaceuticals

100 Endo Blvd.

Chadds Ford, PA 19317

Email: [shu.amos@endo.com](mailto:shu.amos@endo.com)

**TRADEMARK INFORMATION**

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.