References

[1] "Leading Manufacturer of Intimate Apparel, Sportswear, Performance Wear and Swimwear | MAS - Change Is Courage." [Online]. Available: http://www.masholdings.com/. [Accessed: 06-Jul-2016].

[2] "Apparel: Design, Textiles & Construction, 10th Edition." [Online]. Available: http://www.g-wonlinetextbooks.com/apparel-design-textiles-construction-2012/. [Accessed: 06-Jul-2016].

[3] W. Mary G, "Successful Sewing, 7th Edition." [Online]. Available: http://www.g-w.com/successful-sewing-2013. [Accessed: 06-Jul-2016].

[4] "6 Metrics To Track Your Factory Cutting Today!," 2015

[5] ("Leading Manufacturer of Intimate Apparel, Sportswear, Performance Wear and Swimwear | MAS - Change Is Courage," n.d.)

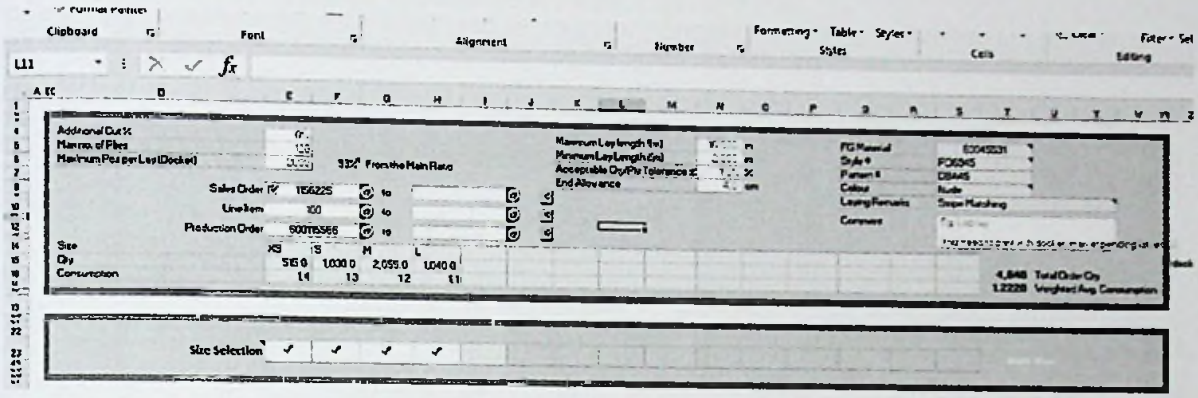
[7] ("Apparel: Design, Textiles & Construction, 10th Edition," n.d.)

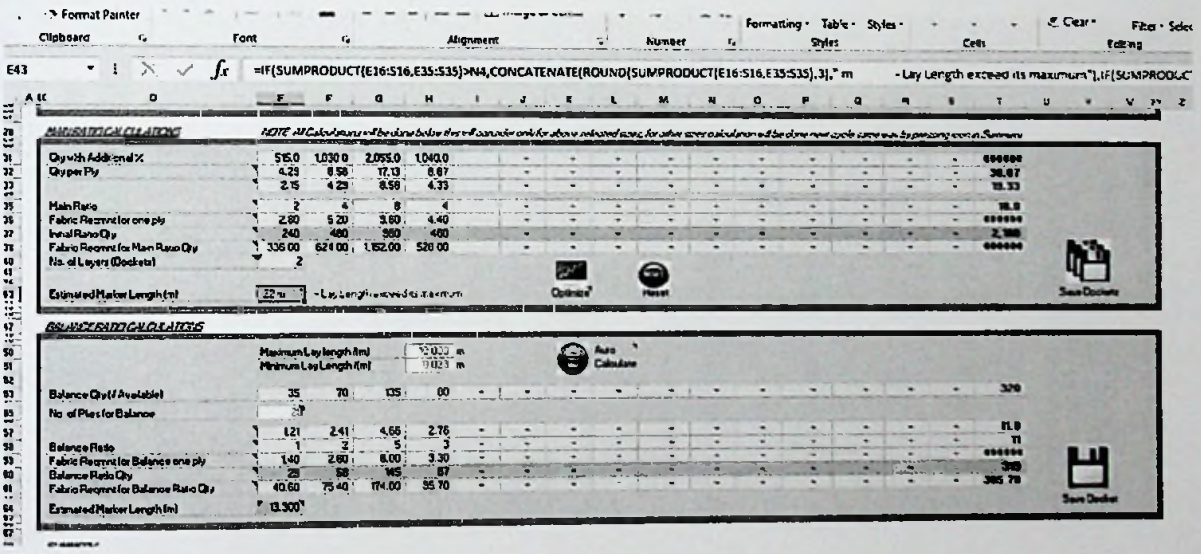
[8] ("A Study of Productivity and Financial Efficiency of Textile Industry of India," 2010)

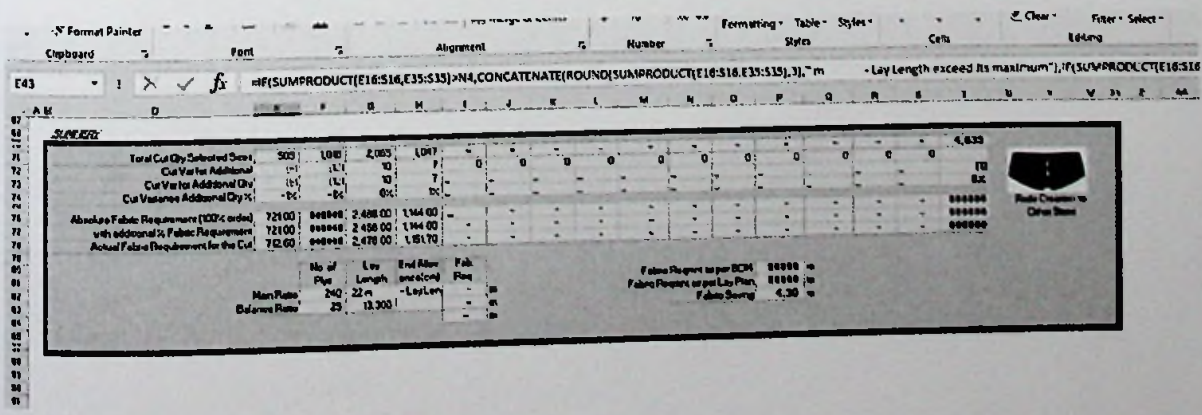
Appendix A

Existing system Details

Excel based ratio Planning Sheet.



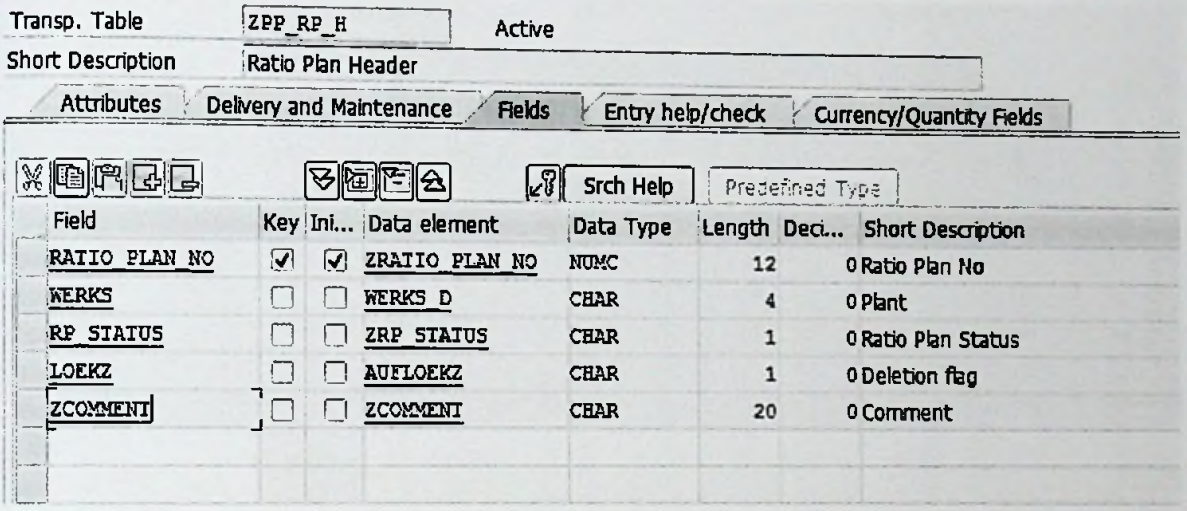




Appendix B

SAP Based Proposed system implementation details.

1. Databased table Structures.



Transp. Table ZPP_RP_H Active

Short Description Ratio Plan Header

Attributes | Delivery and Maintenance | Fields | Entry help/check | Currency/Quantity Fields

Srch Help | Predefined Type

Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
RP_STATUS	☐	☐	ZRP_STATUS	CHAR	1	0	Ratio Plan Status
LOEKZ	☐	☐	AUFLOEKZ	CHAR	1	0	Deletion flag
ZCOMMENT	☐	☐	ZCOMMENT	CHAR	20	0	Comment

Transp. Table ZPP_RP_SO Active

Short Description Ratio Plan Sales Orders

Attributes | Delivery and Maintenance | Fields | Entry help/check | Currency/Quantity Fields

Srch Help | Predefined Type

Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
MANDT	☑	☑	MANDT	CLNT	3	0	Client
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
VBELN	☑	☑	VBELN_VA	CHAR	10	0	Sales Document
POSNR	☑	☑	POSNR_VA	NUMC	6	0	Sales Document Item
AUFNR	☑	☑	AUFNR	CHAR	12	0	Order Number
ORD_NO	☑	☑	ZORD_NO	CHAR	10	0	Internal Order Number
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
WASTAGE	☐	☐	ZWASTAGE_D	QUAN	13	3	Wastage
MARKER_TYPE	☐	☐	ZMARKER_TYPE	CHAR	1	0	Marker Type
ORD_QTY	☐	☐	WMENG	QUAN	13	3	Order quantity in sales units
MATNR	☐	☐	MATNR	CHAR	18	0	Material Number
ZZCUST_STYLE	☐	☐	ZCUST_STYLE	CHAR	20	0	Customer Style
ZDATE	☐	☐	ZMDATE	DATS	8	0	Modification date
UNAME	☐	☐	UNAME	CHAR	12	0	User Name

Transp. Table ZPP_RP_PANEL Active

Short Description Ratio Plan Panels

Attributes | Delivery and Maintenance | Fields | Entry help/check | Currency/Quantity Fields

Srch Help | Predefined Type

Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
MANDT	☑	☑	MANDT	CLNT	3	0	Client
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
FG_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
CUI_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
FAB_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
DELI	☐	☐	FLAG	CHAR	1	0	General Flag
PANEL_STATUS	☐	☐	ZPANEL_STATUS	CHAR	1	0	Panel Status
COMMENTS	☐	☐	CHAR200	CHAR	200	0	Text field length 200
FAB_WASTAGE	☐	☐	ZWASTAGE_D	QUAN	13	3	Wastage
COM_SEQ	☐	☐	ZCOM_SEQ	INT1	3	0	fabric Combine Sequence

Transp. Table ZPP_RP_D Active

Short Description Ratio Plan Detail

Attributes | Delivery and Maintenance | Fields | Entry help/check | Currency/Quantity Fields

Srch Help | Predefined Type

Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
MANDT	☑	☑	MANDT	CLNT	3	0	Client
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
CUT_MATNR	☑	☑	ZCUT_MATNR	CHAR	18	0	Cut Panel Material
FAB_MATNR	☑	☑	ZFAB_MATNR	CHAR	18	0	Fabric
J_3ASIZE	☑	☑	J_3ASIZE	CHAR	8	0	Grid Value
MARKER_ID	☑	☑	ZMARKER_NO	NUMC	3	0	Marker ID
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
MARKER_NO	☐	☐	ZMARKER_NAME	CHAR	20	0	Marker Name
ORD_QTY	☐	☐	ZORD_QTY	QUAN	13	3	Order Quantity
SAMPLE_QTY	☐	☐	ZSAMPLE_QTY	QUAN	13	3	Sample QuantitySample Quantity
ALLOWANCE	☐	☐	ZALLOWANCE	QUAN	13	3	Allowance
WASTAGE	☐	☐	ZWASTAGE_D	QUAN	13	3	Wastage
CONSUMPTION	☐	☐	ZCONSUM	QUAN	13	3	Consumption
NO_OF_PLIES	☐	☐	ZNO_OF_PLIES	NUMC	4	0	Number of Plies
NO_DOCKETS	☐	☐	ZNO_DOCKETS	NUMC	4	0	Number of Dockets
RATIO	☐	☐	ZRATIO	NUMC	4	0	RATIO
WIDTH	☐	☐	ZWIDTH_L	QUAN	13	3	Width

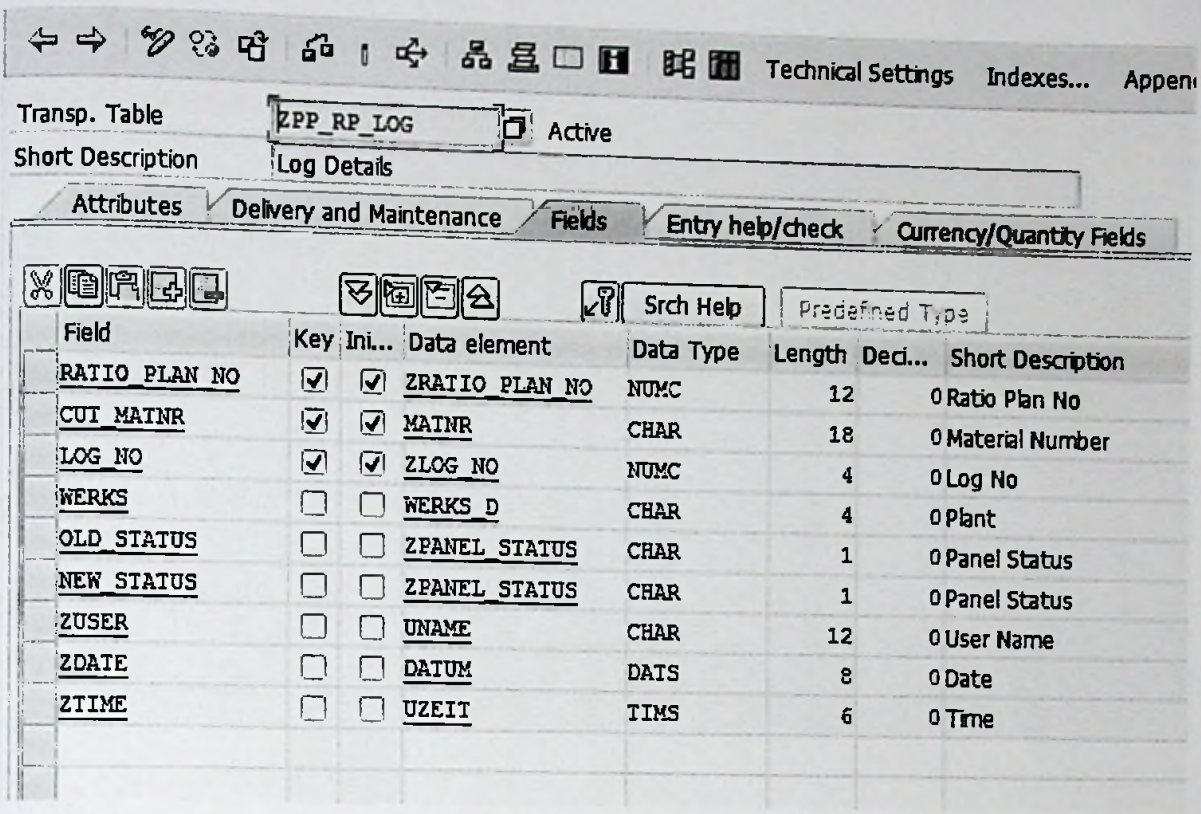
Transp. Table ZPP_RP_PANEL Active

Short Description Ratio Plan Panels

Attributes | Delivery and Maintenance | Fields | Entry help/check | Currency/Quantity Fields

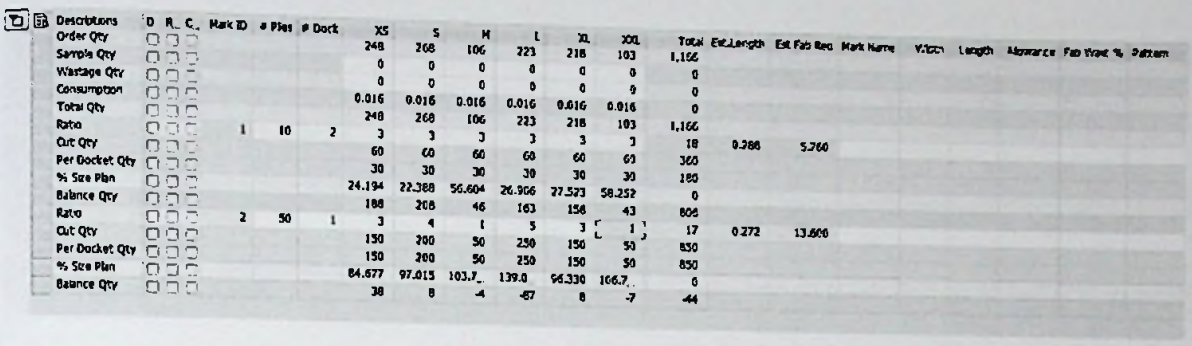
Srch Help | Predefined Type

Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
MANDT	☑	☑	MANDT	CLNT	3	0	Client
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
FG_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
CUT_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
FAB_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
DFLT	☐	☐	FLAG	CHAR	1	0	General Flag
PANEL_STATUS	☐	☐	ZPANEL_STATUS	CHAR	1	0	Panel Status
COMMENTS	☐	☐	CHAR200	CHAR	200	0	Text field length 200
FAB_WASTAGE	☐	☐	ZWASTAGE_D	QUAN	13	3	Wastage
COM_SEQ	☐	☐	ZCOM_SEQ	INT1	3	0	fabric Combine Sequence



Field	Key	Ini...	Data element	Data Type	Length	Deci...	Short Description
RATIO_PLAN_NO	☑	☑	ZRATIO_PLAN_NO	NUMC	12	0	Ratio Plan No
CUT_MATNR	☑	☑	MATNR	CHAR	18	0	Material Number
LOG_NO	☑	☑	ZLOG_NO	NUMC	4	0	Log No
WERKS	☐	☐	WERKS_D	CHAR	4	0	Plant
OLD_STATUS	☐	☐	ZPANEL_STATUS	CHAR	1	0	Panel Status
NEW_STATUS	☐	☐	ZPANEL_STATUS	CHAR	1	0	Panel Status
ZUSER	☐	☐	UNAME	CHAR	12	0	User Name
ZDATE	☐	☐	DATUM	DATS	8	0	Date
ZTIME	☐	☐	UZEIT	TIMS	6	0	Time

Appendixes for Auto Ratio calculation code.



Descriptions	D	R	C	Mark ID	# Plies	# Dock	XS	S	M	L	XL	XXL	Total	Est Length	Est Fab Req	Mark Name	Width	Length	Allowance	Fab Width %	Pattern
Order Qty							248	268	106	223	218	103	1,166								
Sample Qty							0	0	0	0	0	0	0								
Wastage Qty							0	0	0	0	0	0	0								
Consumption							0.016	0.016	0.016	0.016	0.016	0.016	0								
Total Qty							248	268	106	223	218	103	1,166								
Ratio				1	10	2	3	3	3	3	3	3	18	0.288	5.760						
Cut Qty							60	60	60	60	60	60	360								
Per Docket Qty							30	30	30	30	30	30	180								
% Size Plan							24.194	22.388	56.604	26.906	27.523	58.252	0								
Balance Qty							188	208	46	163	158	43	806								
Ratio				2	50	1	3	4	1	5	3	1	17	0.272	13.600						
Cut Qty							150	200	50	250	150	50	850								
Per Docket Qty							150	200	50	250	150	50	850								
% Size Plan							84.677	97.015	103.7_	139.0	96.330	106.7_	0								
Balance Qty							38	8	-4	-67	8	-7	-44								

```
DATA: li_sku_tem  TYPE TABLE OF tfl_sku.

  DATA: wa_flname(20)          TYPE c,
        lv_wastage             TYPE menge_d,
        lv_plies               TYPE menge_d,
        lv_totcut              TYPE menge_d,
        lv_dockets             TYPE menge_d,
        lv_totratio            TYPE menge_d,
        lv_mak_id              TYPE menge_d,
        lv_length              TYPE menge_d,
        lv_allow               TYPE menge_d,
        lv_est_length          TYPE menge_d,
        lv_round_val           TYPE menge_d,
        lv_ral_val             TYPE menge_d,
        lv_incri_val           TYPE menge_d,
        lv_tolren              TYPE menge_d,
        lv_sum_val             TYPE menge_d,
        lv_sum_seletd_qty      TYPE menge_d,
        lv_cut_spe             TYPE flag.

  CLEAR:lv_est_length,lv_allow,lv_length,lv_totratio,lv_dockets,
        lv_totcut,lv_plies,lv_wastage,gv_tot_wat,gv_tot_coun,gv_bal_falg,
        gv_bal_falg,lv_sum_val,lv_sum_seletd_qty.


  li_sku_tem = gi_sku.

*---get the Selected size Qty
  LOOP AT gi_sku ASSIGNING <fs_sku>.
    READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = <fs_sku>-
j_3asize.  "Grid Mapping
```

```
    IF sy-subrc = 0.
      READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fieldname =
gwa_gridval-feild.
      IF sy-subrc = 0.
        lv_sum_seletd_qty = lv_sum_seletd_qty + <fs_sku>-kwmeng.
      ENDIF.
    ENDIF.
  ENDLOOP.

*---Do calculations in itab
  lv_row = 0.
  LOOP AT <t_dyntable> ASSIGNING <fs_dyntable>.
    lv_row = lv_row + 1.
    CHECK lv_row <> '1'.

    wa_flname = 'IND'. "Indicator
    ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldval>.


******************** Process the Sample Qty ******************

    IF <fs_fldval> = 'A'.
      LOOP AT gi_sku ASSIGNING <fs_sku>.
        IF gv_dif_style = abap_true.
          wa_flname = <fs_sku>-size_order.
        ELSE.
          wa_flname = <fs_sku>-j_3asize.
        ENDIF.

        READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = wa_flnam
e.  "Grid Mapping
        IF sy-subrc = 0.
          wa_flname = gwa_gridval-feild.

          READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fieldnam
e = wa_flname.
          IF sy-subrc = 0.
            ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_f
ldval>.
            <fs_sku>-sample_qty = <fs_fldval>.
            lv_sum_val = lv_sum_val + <fs_sku>-sample_qty .
```

```
          ENDIF.
        ENDIF.
      ENDLOOP."End of sample Qty


      "---Sum of sample Qty
      IF lv_sum_val IS NOT INITIAL.
        wa_flname = 'TOT_RATIO'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.
        <fs_fldval> = lv_sum_val.
        CLEAR:lv_sum_val.
      ENDIF.


***************** Process the Wastage ******************
    ELSEIF  <fs_fldval> = 'B'.
      LOOP AT gi_sku ASSIGNING <fs_sku>.
        IF gv_dif_style = abap_true.
          wa_flname = <fs_sku>-size_order.
        ELSE.
          wa_flname = <fs_sku>-j_3asize.
        ENDIF.

        READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = wa_flnam
e.  "Grid Mapping
        IF sy-subrc = 0.
          wa_flname = gwa_gridval-feild.

          READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fieldnam
e = wa_flname.
          IF sy-subrc = 0.
            ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_f
ldval>.
            <fs_sku>-wastage = <fs_fldval>.
            gv_tot_wat = gv_tot_wat + <fs_fldval>.
            CLEAR: lv_wastage,wa_flname.
          ENDIF.
        ENDIF.
      ENDLOOP."End of cal wastage
```

```
      IF gv_tot_wat IS NOT INITIAL.
        "Sum of wastage Qty
        wa_flname = 'TOT_RATIO'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.
        <fs_fldval> = gv_tot_wat.
      ENDIF.


****************** Process the Total Qty ********************

    ELSEIF  <fs_fldval> = 'C'.
      LOOP AT gi_sku ASSIGNING <fs_sku>.
        IF gv_dif_style = abap_true.
          wa_flname = <fs_sku>-size_order.
        ELSE.
          wa_flname = <fs_sku>-j_3asize.
        ENDIF.

        READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = wa_flnam
e.  "Grid Mapping
        IF sy-subrc = 0.
          wa_flname = gwa_gridval-feild.
          READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fieldnam
e = wa_flname.
          IF sy-subrc = 0.
            ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_f
ldval>.
            <fs_sku>-tot_qty = <fs_sku>-kwmeng + <fs_sku>-
sample_qty + <fs_sku>-wastage.
            <fs_fldval>      = <fs_sku>-tot_qty. "Total Qty For Size wise
            lv_totcut        = lv_totcut + <fs_sku>-tot_qty.
          ENDIF.
        ENDIF.

      ENDLOOP.

      "Sum of Cut Qty
      IF lv_totcut IS NOT INITIAL.
        wa_flname = 'TOT_RATIO'.
        ASSIGN COMPONENT  wa_flname
```

```
          OF STRUCTURE <fs_dyntable> TO <fs_fldval>.
        <fs_fldval> = lv_totcut.
      ENDIF.

**************Process the Consuptions Data***************

    ELSEIF  <fs_fldval> = 'D'.
      LOOP AT gi_sku ASSIGNING <fs_sku>.
        IF gv_dif_style = abap_true.
          wa_flname = <fs_sku>-size_order.
        ELSE.
          wa_flname = <fs_sku>-j_3asize.
        ENDIF.

        READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = wa_flnam
e.  "Grid Mapping
        IF sy-subrc = 0.
          wa_flname = gwa_gridval-feild.
          READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fieldnam
e = wa_flname.
          IF sy-subrc = 0.
            ASSIGN COMPONENT wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fl
dval>.
            <fs_sku>-consumption = <fs_fldval> .
            gv_tot_coun = gv_tot_coun + <fs_sku>-consumption.
          ENDIF.
        ENDIF.
      ENDLOOP.

*************** PROCESS THE RATIO CALCULATION **********************

    ELSEIF  <fs_fldval> = 'X'.
*---Size wise ratio calculation
      IF lv_row = 6.

        wa_flname = 'MARKER_ID'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.
        lv_mak_id = <fs_fldval>.
        CLEAR:wa_flname.
```

```
        lv_plies = 0.
        wa_flname = 'PLIES'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.
        IF sy-ucomm = 'AUTO_R'.
          <fs_fldval> = gwa_ratio_para-max_plies.
        ENDIF.
        lv_plies    = <fs_fldval>.


        "get the Cut Speratly Indication
        wa_flname = 'C_CUT'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.
        lv_cut_spe = <fs_fldval>.

*----Claculate the number of Dockets
        wa_flname = 'DOCKETS'.
        ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_fldva
l>.

*         IF sy-ucomm = 'OPTIMIZE'. "For Optimaze
*           <fs_fldval> = <fs_fldval> + 1.
*
*         ELSEIF sy-ucomm = 'AUTO_R'.
        IF gwa_ratio_para-max_dkt_pcs <> 0.

*           <fs_fldval> = trunc( gv_tot_qty / gwa_ratio_para-max_dkt_pcs ).
          <fs_fldval> = trunc( lv_sum_seletd_qty / gwa_ratio_para-
max_dkt_pcs ).
          IF <fs_fldval> IS INITIAL.
            <fs_fldval> = 1.
          ENDIF.
        ENDIF.
*         ENDIF.
        lv_dockets  = <fs_fldval>.
        CLEAR:wa_flname,gwa_gridval."end of cal # of dokets

*---Calculate the total ratio for First Ratio
        LOOP AT gi_sku ASSIGNING <fs_sku>.
          IF gv_dif_style = abap_true.
```

```
            wa_flname = <fs_sku>-size_order.
          ELSE.
            wa_flname = <fs_sku>-j_3asize.
          ENDIF.

          READ TABLE gi_gridval INTO gwa_gridval WITH KEY j_3asize = wa_fln
ame.   "Grid Mapping
          IF sy-subrc = 0.
            wa_flname = gwa_gridval-feild.
            ASSIGN COMPONENT  wa_flname OF STRUCTURE <fs_dyntable> TO <fs_f
ldval>.

            IF ( lv_dockets * gwa_ratio_para-max_plies ) <> 0.

*               IF sy-
ucomm = 'OPTIMIZE' AND <fs_fldval> <> 0. "For Optimaze.
*                 lv_ral_val = <fs_sku>-
tot_qty / ( lv_dockets * gwa_ratio_para-max_plies ).
*               ELSE.
              READ TABLE gi_selec_cell TRANSPORTING NO FIELDS WITH KEY fiel
dname = wa_flname.
              IF sy-subrc = 0.
                lv_ral_val = <fs_sku>-
tot_qty / ( lv_dockets * gwa_ratio_para-max_plies ).
              ENDIF.
*               ENDIF.

            ENDIF.
```