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67$7,21

'5$)7 *8,'(72
/+/ &<&/,&
7(67,1*

9HUVLRQ

$SULO

&\FORQH 7HVWLQJ 6WDWLRQ
&ROOHJH RI 6FLHQF⊗FH DQG (QJLQH
-DPHV &RRN 8QLYHUVLW\
4XHHQVODQG

$GPLQLVWUDWLRQ 3KRQH

ZZZ MFX HGX DX FWV

'U DW XLG R/ +/ &\FFZHWQL $SUO

3DJHR I

7 D E O H R I & R Q W H Q W V

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CYON TEST SLATE

DRAFT ufo/H/ CYCLETE1   APRIL

g DETERMINE APPRO SPRACSOE DANCT OR WITH TABLE B
ULTIMATE STRENGTH DESIGN VALUE TO BE ADO

'UDI

'UDI

&\FGR Q7HHW JL6GDWV 0

'U DWY XLG HR /+/ &\FFY HWWQ1 $SUO

'UDWXLGHR/+/&\FRYHWWQ $SUO

o   7KH VSDQV FKRVHQ PXVW LQFOXGH WKH ORZH
    VSDQV DQG DW OHDVW RQH YDOXH LQ EHWZHH
)LJXUH

& \FO

'UDIW XLGH R/ +/ &\FFOHWLQ $SULO

)RU HVWDEOLVKLQJ FRQQHFWLRQ GHVLJQ FDSD

:KHUH D FRQQHFWLRQ FDSDFLW\ LV WR EH HVWDEO

- o &DSDFLWLHV IRU FRQQHFWLRQV WKDW DUH G
     F\FOLF WHVWLQJ IRU FODGGLQJ HRU VXSSRUW
     HVWDEOLVKHG E\ WHVWLQJ

- o $ PLQLPXP RI WKUHH VXFFHVVIXO WHVWV VKD
     HVWDEOLVKLQJ WKH FDSDFLW\ RI WKH FRQQHF

1RWHV

7KHVH SURYLVLRQV DUH LQWHQGHG WR DSSO\
FRQQHFWLRQ LV EHLQJ FDUULHG XVLQJ D WHQV
6XFK WHVWV DUH RIWHQ XVHIXO WR LQYHVWLJD
W\SH WKLFNQHVV RU SURILOH RI VXSSRUWLQJ
VXSSRUWLQJ PHPEHU WR WKH PHPEHU EHORZ 7
PLQLPXP RI PP ORQJ DQG QRUPDOO\ FRQVLV
DQG VPDOO VHFWLRQV RI FODGGLQJ DQG RU V
DVVHPEO\ VKRXOG PLPLF DFWXDO FRQVWUXFWL

7KH GLIIHUHQFH EHWZHHQ WKLV WHVW DQG W
XVH RI D GLIIHUHQW VXSSRUWLQJ PHPEHU XQGH
FRQQHFWLRQ EHWZHHQ WKH VXSSRUWLQJ PHPE
PHPEHU RU D GLIIHUHQW W\SH RI VFUHZ)RU H
EDWWHQ FDQ EH WHVWHG WR TXDQWLI\ WKH VW
FRQQHFWLRQ WR WKH PHPEHU EHORZ RU WKH U
EDWWHQ 7KH IXOO /+/ F\FOH VHTXHQFH VKRXO
VFDOH VKHHWLQJ WHVWV

2QFH WKH FDSDFLW\ RI WKH FRQQHFWLRQ LV I
EH FDUULHG RXW LQYROYLQJ WKH FRQQHFWLRQ
SRWHQWLDO IDLOXUH PRGH RU VWUHQJWK ,I WK
IXOO VFDOH WHVWLQJ PD\ EH QHFHVVDU\ WR IX
WKH PHPEHU RU VFUHZ

7HVW 6SHFLPHQ 0DWHULDOV DQG)DEULFDWLRQ

x 7KH WHVW VSHFLPHQ VKDOO FRQVLVW RI FODGGL
    DQG LPPHGLDWH VXSSRUWLQJ PHPEHUV DVVHPEO
    PDQQHU LGHQWLFDO WR WKRVH SDUWV RI WKH SD
    VSHFLPHQ LV LQWHQGHG WR UHSOLFDWH

x $OO GHWDLOV RI WKH WHVW VSHFLPHQV VKDOO E

'UDW'XLGHR/+/&\FO7HWQ $SUlO

1RWHV

)RU WHVWV FDUULHG RXW WR HVWDEOLVK ORDG WDEO
IROORZLQJ IHDWXUHV WR HQVXUH WKH YDOLGLW\ RI V

   x 7KH ZLGWK RI WKH WHVW VSHFLPHQ VKRXOG EH D
     ZLGH DQG LQFOXGH DW OHDVW RQH FODGGLQJ RY
     ZKLFK WKH LQWHUORFNLQJ RI WKH HGJHV RI DGM
     HVVHQWLDO WR WKHLU IDVWHQLQJ DW OHDVW WZ
     LQFRUSRUDWHG LQ WKH WHVW VSHFLPHQ

   x &RQWLQXRXV FODGGLQJ VKRXOG EH VXSSRUWHG
     WR UHSUHVHQW D GRXEOH HQG VSDQ FRQGLWLRQ

   x)RU QRQ FRQWLQXRXV FODGGLQJ HOHPHQWV ZKHU
     RYHUODSV DUH UHTXLUHG IRU WUDQVIHUULQJ IDV
     DQG FOLSV D PLQLPXP RI IRXU HOHPHQWV ZLGH
     VKRXOG EH FRQVLGHUHG H J VL[WHHQ FODGGLQ

   ,QWHUSUHWDWLRQ RI 7HVW 5HVXOWV

   *HQHUDO 3ULQFLSOHV

   x ,QWHUSRODWLRQ RI GHVLJQ FDSDFLW\ EHWZ GHULYHG
     H[WUDSRODWLRQ RI SDUDPHWHUV RXWVLGH WKH WH

   x 7HVW UHVXOWV IURP RQH IDVWHQHU RU FODGGLQJ
     DFFHSWDEOH IRU DQRWKHU IDVWHQHU RU FODGGLQ
     ERWK IDVWHQHUV RU ERWK FODGGLQJV KDYH WKH
     ZLOO GHWHUPLQH WKHLU F\FOLF ORDG FDSDFLWLHV

   x $OO WHVWV VKRXOG VKRZ KDYH VLPLODU RU SRWHQWL
     YLVLEOH GDPDJH DIWHU WKH WHVW WR FRXQW DV S
     :KHUH WKH SRWHQWLDO IDLOXUH PRGH FKDQJHV IR
     RQH IXUWKHU WHVW PXVW EH FDUULHG RXW DW D G
     PLQLPXP RI WZR VSDQ YDOXHV KDYH WKH VDPH SRW

   x ,I DQ\ WHVW IDLOV IXUWKHU WHVWLQJ VKDOO EH F
     ZLWK D ORZHU VSDQ YDOXH DV GHVF
     6HFWLRQ I

   5HFRPPHQGHG $FFHSWDQFH &ULWHULD

7KH WHVWV EH VKRXOG VLPLODU VWUXFWXUHG HVVIXO
                    R 0`\HF RÐEH@0 —DPAÕu

'UDWXQGHR/+/ &\FFO7HWQL $SUUO

- x 7KHUH VKDOO EH QR ORVV RI ORDG FDUU\LQJ FDSD
  WKH VSHFLPHQ

1RWHV

- x 7KH SXUSRVH RI WKH WHVW LV WR SUHYHQW WKH O
  HQYHORSH DQG WKH JHQHUDWLRQ RI ZLQG ERUQH
  VKRXOG QRW EH FRQVLGHUHG DV IDLOXUH 'LVWRUV
  DUH DFFHSWDEOH DV ORQJ DV WKHUH LV QR ORVV I

- x 7KH ORVV RI RQH IDVWHQHU LV D ORVV RI ORDG FD
  WUHDWHG DV IDLOXUH 7KLV UHTXLUHPHQW UHFRJQ
  WKHUH ZLOO EH ORDG VKHGGLQJ WR DQ\ LPPHGLDW
  WXUQ ZLOO YHU\ OLNHO\ IDLO DV WKH\ ZLOO WKHQ
  XQ]LSSLQJ HIIHFW

- x)RU D FODGGLQJ WHVW ZKHUH WKH SRWHQWLDO PR
  EXFNOLQJ DQG RU SODVWLF KLQJH ³IROGOLQHV´ PD
  VLJQLILFDQW IDFWRU WKDW DVVLVWV WKH FODGGLQ
  IRU UHODWLYHO\ ORQJ FODGGLQJ VSDQV $V QRWHO
  PHPEUDQH DFWLRQ PD\ QRW EH DEOH WR EH UHVLV
  VXSSRUWV ZKHQ WKH FODGGLQJ LV LQVWDOOHG LQ
  UHSRUW VKRXOG GHVFULEH WKH LQLWLDWLRQ RI EX
  IRUPDWLRQ LQFOXGLQJ WKH ORDG DW ZKLFK LW ZD
  PHPEUDQH DFWLRQ ZDV OLNHO\ D VLJQLILFDQW IDF
  WKDW WKH VXSSRUWV VKRXOG EH GHVLJQHG WR UH

'UDWXLGHR/+/ &\FF7HWLQ $SLlO

$QQH[$R÷NHG ([DPSOHV

$ 0HWDO 5RRI &ODGGLQJ

$ PHWDO URRI FODGGLQJ WULSOH VSDQ WHVW VSHFLPHQ
VXSSRUWW₁DGRRSWDQG DXVHV WZR UH₂OLFDWKRQWHVJLYLQ
VSHFLPHQ SDVVHV D /+/ F\FOLF WHVW   XVLQJ D WHVW
FUDFNLQJ DURXQG WKH VFUHZV)RU WKLV RQH WHVW
ZLOO EH   N3D

,I D VHFRQG WHVW VSHFLPHQ XVLQJ LGHQWLFDO FODG
GLIIHUHQW WULSOH VSDQ O₁LQWWKKHOVRPHSDSRWWODW/+DO
IDLOXUH WKHQ ERWK WHVW₁VSHFLPHQGFRQ XRXHUD YDO
UHSOLFDWLRQV 1RZ WKH ILUVW WHVW VSHFLPHQ ZLOO
GHVLJQ FDSDFLW\ RI   N3D

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NWKHUHIRUH LQ WKLV FDVH WKH QXPEHU RURPSOLFDW
WKH WDEOH

$ 7LOH &OLSV

$ PDQXIDFWXUHU RI FRQFUHWH WLOH URRI FODGGLQJ V
WR UHVLVW D F\FORQLF ZLQG ORDG $ F\FOLF ORDG LV
FRQWUROOHG K\GUDXOLF UDPV 7KH WHVW FRQILJXUDW
FRXUVHV ZLGH 7KH FHQWUDO VL[WHHQ WLOHV IRXU U
 WKH DGGLWLRQDO WLOHV DUH UHTXLUHG LQ WKH VHWX
FRUUHFW RULHQWDWLRQ DV WZR HGJHV RI D WLOH ODS
WLOHV DUH ORDGHG RQO\ WZR WLOH FOLSV DUH IXOO\
WKDW DUH QRW IXOO\ ORDGHG DQG VR GR QRW KDYH W
WHVW VSHFLPHQ KDV WZR U\SODFHDWLRQVDYQG PD\ XVH
SHUPLWWHG E\ 6HFWLRQ

$ 5RRI %DWWHQ 6SDQ 7DEOH

$ PDQXIDFWXUHU RI PHWDO URRI EDWWHQV ZDQWV WR
WDEOHV DUH WR VKRZ VSDQ RI EDWWHQ YHUVXV GLVWU
XVHG WR DSSO\ D F\FOLF ORDG WR WKH FODGGLQJ ZKLF
GLIIHUHQW WULSOH VSDQ WHVW FRQILJXUDWLRQV DUH
          DQG   5RRI FODGGLQJ ZRXOG EH VFU
D GRXEOH VSDQ DUUDQJHPHQW XVLQJ WKUHH EDWWHQV
DVVHPEOLHV FRXOG EH XVHG RQ WKH FODGGLQJ WR KH
SULRU WR IDLOXUH RI WKH FHQWUDO EDWWHQ 7KH ED
UHSUHVHQWLQJ WRS FKRUGV H J IRU WKH   WH
VSDFHG   PP DSDUW)RU WKLV H[DPSOH WKH FHQWUD
WKH EDWWHQ VSDQ WDEOHV VKDOOPEH FRQVWUDLQHG V

3RWHQWLDO PRGHV RI IDLOQFOXUHRI WKH EDWWHQ FRXOG

  ‡)DLOXUH DW WKH EDWWHQ WRS IODQJH E\ D FODGGL
  ‡ %HQGLQJ EXFNOLQJ IDLOXUH RI EDWWHQ
  ‡ %DWWHQ WHDULQJ DURXQG D VFUHZ IL[LQJ LW WR D
     IHHW

+RZHYHU RQO\ WKRVH WHVW UHVXOWV ZLWK QRPLQDOO
FRQVLGHUHG DQG ZLWK D VLPLODU SRWHQWLDO PRGH I
GHWHUPLQLQJ QXPEHU RI UHSOLFDWLRQV

7R LOOXVWUDWH WKLV FRQFHSW RI GLIIHUHQW SRWHQW
IROORZLQJ

$VVXPH WKDW IRU WKLV SURJUDPPHPWKHQFDOOEXOODWHHQGVSX
IRU DOO WKUHH WHVWV DUH QRPLQDOO\ WKH VDPH DQG
SDVV /+/ WHVWV DQG VKRZ VLJQV RI FUDFNLQJ DURXQG
WKUHH VSHFLPHQV FDQ EH FRXQWHG DV UHSOLFDWHV I
EXW DV HDFK WHVW VSHFLPHQ KDV WZR LGHQWLFDO LQ