

SUMMARY

THIS DRAWING DESCRIBES THE MOVEMENTS AND TOLERANCES SPECIFIED FOR THE ELEMENTS OF THE STRUCTURAL STEEL FRAME SUPPORTING THE GRC CLADDING FAÇADE SYSTEM ON THE RIYADH METRO IF4 TRANSFER STATION. THE INFORMATION IS RELEVANT TO THE STRUCTURAL STEELWORK AND GRC CLADDING CONNECTIONS, AS WELL AS CONNECTIONS TO THE REINFORCED CONCRETE SUPERSTRUCTURE, AND GROUND LEVEL FOUNDATIONS.

IN THIS REPORT, TOLERANCE WILL REFER TO AN ALLOWANCE MADE IN THE DESIGN DIMENSIONING TO ALLOW FOR THE ANTICIPATED ACCURACY OF FABRICATION, CONSTRUCTION AND INSTALLATION. THE VALUES STATED HERE ARE PERMITTED DEVIATIONS FROM THE DESIGN DIMENSIONING SPECIFIED, FOR THE ELEMENTS OF THE STRUCTURAL STEEL FRAME, AND THE STRUCTURAL ELEMENTS OF THE SYSTEM OF CONSTRUCTION, WHEREAS MOVEMENTS RELATE TO STRUCTURAL DEFORMATION UNDER APPLIED LOADS.

LOADINGS

VERTICAL LOADS

OF THE VERTICAL LOAD IS THE DEAD LOAD FROM THE SELF-WEIGHT OF THE STEEL AND THE LOADING OF THE GRC CLADDING.

HORIZONTAL LOADS

WIND LOADS APPLIED TO THE STRUCTURE.

TEMPERATURE

THE TEMPERATURE RANGES EXERTED ON THE STRUCTURE ARE GIVEN ON DRAWING 204351.

TOLERANCES

ALL PERMITTED TOLERANCES, INCLUDING FABRICATION, INSTALLATION AND ANCHORAGE TO THE EXISTING STRUCTURE, SHALL BE IN ACCORDANCE WITH THE AISC STEEL CONSTRUCTION MANUAL, THE AISC 303-10 GUIDANCE DOCUMENT, ASTM A6 / A6M GUIDANCE DOCUMENT, INCLUDING ALL ASSOCIATED REFERENCES MADE AS PART OF THIS GUIDANCE.

THE CONTRACTOR SHALL OBTAIN THE TECHNICAL INFORMATION, CONTRACT DOCUMENTS AND AISC GUIDANCE, THE MORE ONEROUS SHALL APPLY.

TOLERANCES ARE NOT TO BE CONSIDERED AS CUMULATIVE, WHERE EACH ELEMENT'S 'AS-BUILT' POSITION SHOULD BE TAKEN AGAINST THE DESIGN POSITION. THE MEMBER WORKING POINTS ARE TO BE IN ACCORDANCE WITH THE AISC 303 GUIDANCE.

THE STEELWORK CONTRACTOR SHALL CARRY OUT AN AS-BUILT SURVEY OF THE EXISTING SUPPORTS, STRUCTURES AND STRUCTURES WHERE THE STEEL FRAME IS TO BE CONNECTED TO, TO ESTABLISH ANY OFFSETS REQUIRED IN ORDER TO NEGATE ACCUMULATING TOLERANCES.

DEFLECTION

THE STEEL FRAME HAS BEEN DESIGNED TO LIMIT DEFLECTION IN ACCORDANCE WITH THE DIAGRAMS
BELOW.

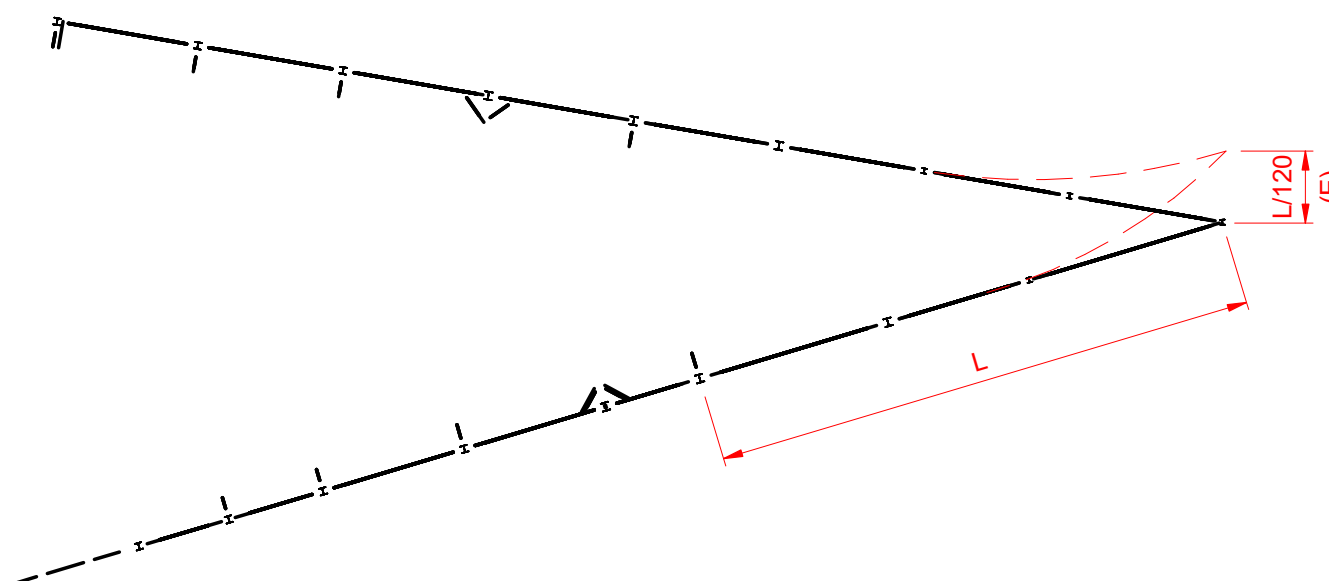


TYPICAL ELEVATION SHOWING BEAM AND COLUMN DEFLECTION LIMITS

LATERAL DEFLECTION TO HORIZONTAL BEAMS UNDER TOTAL LOADING: L/250 (A)
LATERAL DEFLECTION TO HORIZONTAL BEAMS UNDER WIND LOADING: L/360 (B)
LATERAL DEFLECTION TO VERTICAL COLUMNS UNDER TOTAL LOADING: L/250 (C)
LATERAL DEFLECTION TO VERTICAL COLUMNS UNDER WIND LOADING: L/360 (D)
LATERAL DEFLECTION TO VERTICAL CANTILEVER COLUMNS UNDER TOTAL LOADING: L/125 (E)

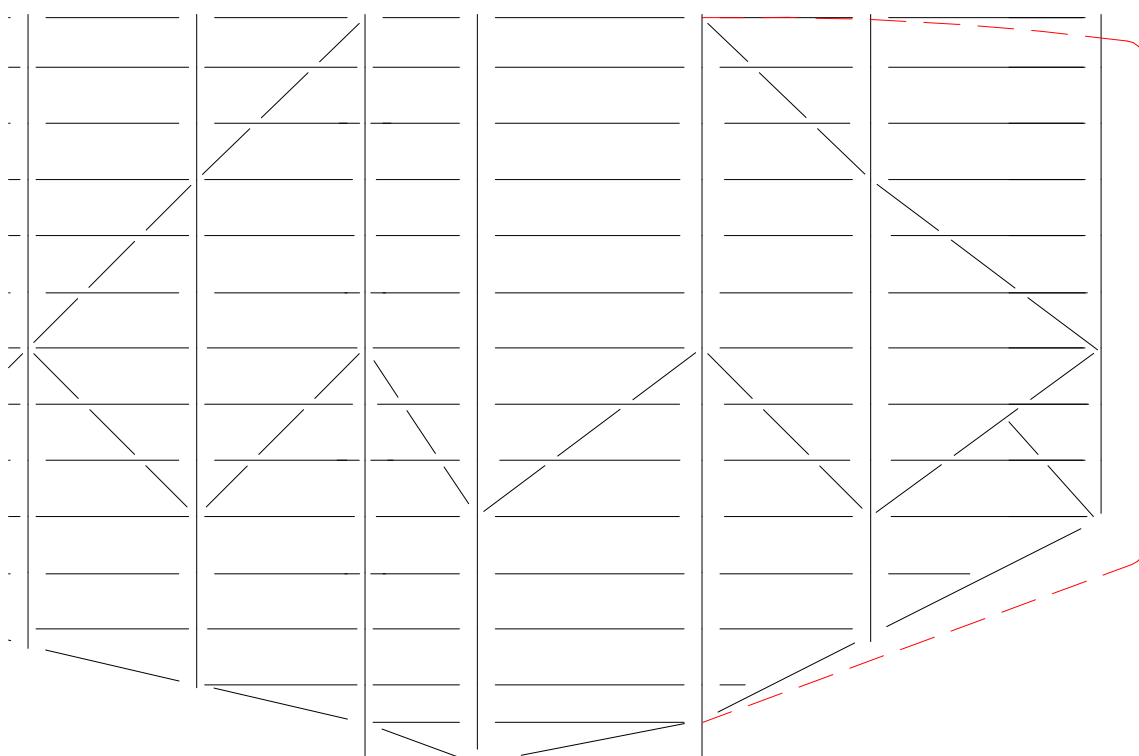
VERTICAL DEFLECTION OF HORIZONTAL BEAMS UNDER TOTAL LOADING: $L/500$

FOR HORIZONTAL DEFLECTION L IS CONSIDERED TO BE THE SPAN BETWEEN LATERAL SUPPORTS.
FOR VERTICAL DEFLECTION L IS CONSIDERED TO BE THE SPAN BETWEEN VERTICAL SUPPORTS.



PLAN VIEW SHOWING PROW LATERAL DEFLECTION LIMIT

HORIZONTAL DEFLECTION TO CORNER PROWS UNDER TOTAL LOADING: $L/120$ (E)



TYPICAL PROW ELEVATION SHOWING VERTICAL DEFLECTION LIMITS

TOP VERTICAL DEFLECTION TO CANTILEVER CORNER PROWS UNDER TOTAL LOADING: H2/250 (F)
BOTTOM VERTICAL DEFLECTION TO CANTILEVER CORNER PROWS UNDER TOTAL LOADING: H1/250 (G)

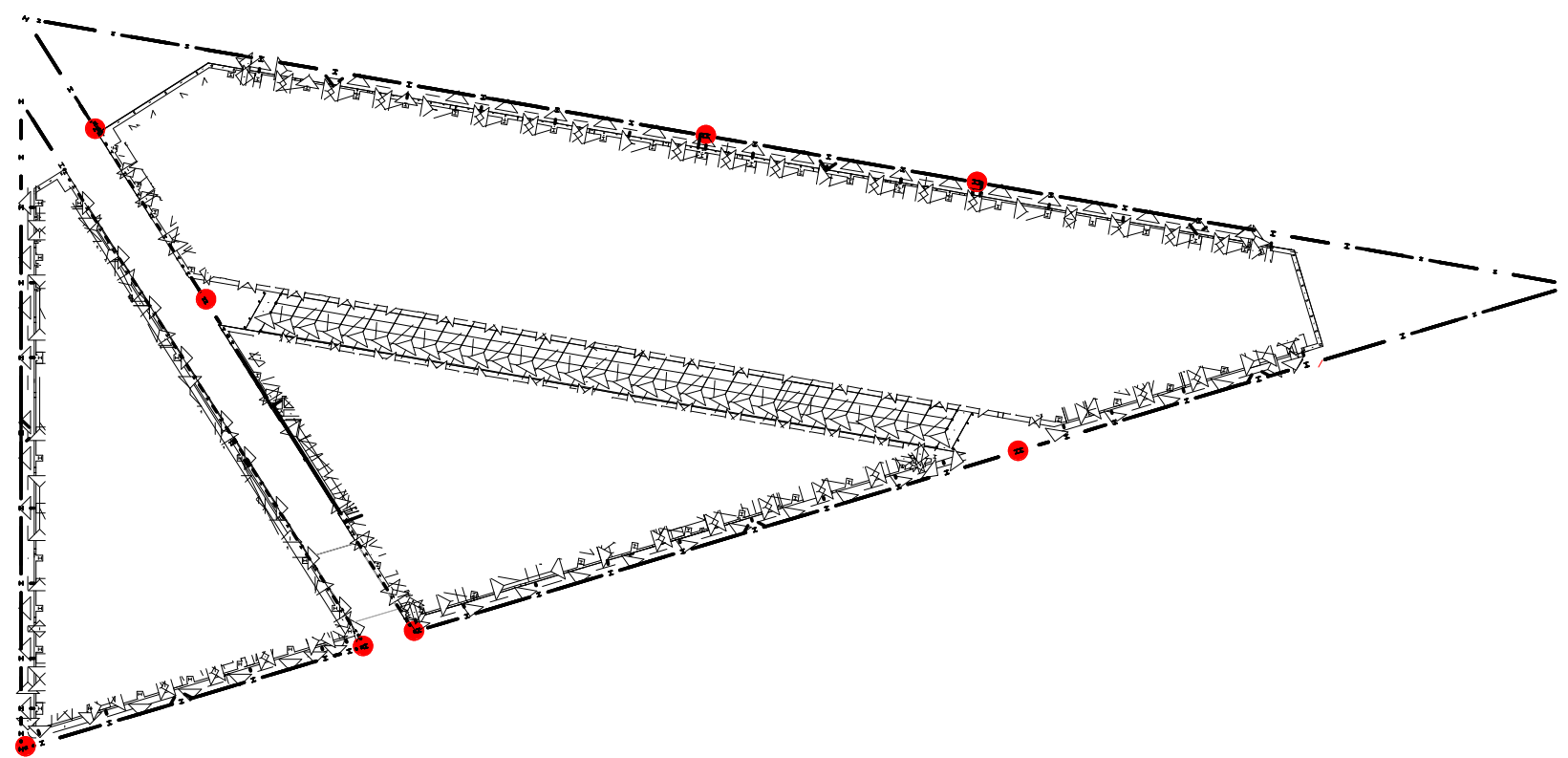
THE DIAGRAMS SHOW EXAMPLES OF WHERE THE DEFLECTION CRITERIA SHOULD BE APPLIED.

MOVEMENT JOINT DISPLACEMENT

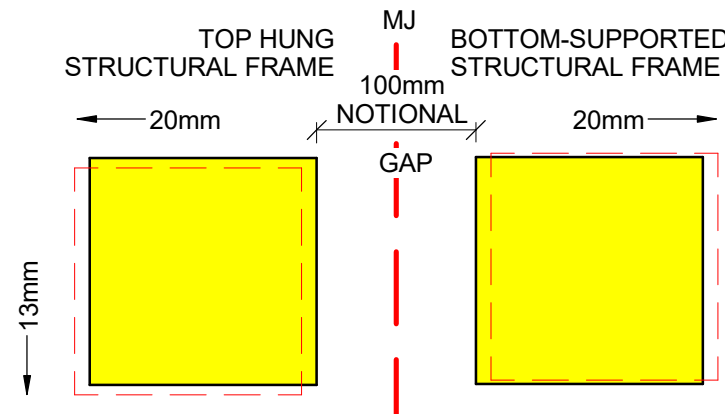
THE MOVEMENT JOINTS IN THE STEEL CONSISTS OF A 100MM GAP IN THE STEEL FRAME. REFER TO FIGURE, BELOW.

CALCULATED DISPLACEMENTS AT MOVEMENT JOINT LOCATIONS ARE GIVEN BELOW. THESE VALUES ARE TO AID THE CLADDING CONTRACTOR AND ARE FOR A COMBINED LOAD CASE OF THERMAL, WIND, COPPER CLADDING AND GRC REVEAL LOADS ONLY. THE STEEL SELF-WEIGHT AND GRC PANEL WEIGHT IS NOT INCLUDED. THIS IS BECAUSE THE GRC IS TO BE ADJUSTED ON SITE WHEN INSTALLED TO TAKE INTO ACCOUNT THE DEFLECTION OF THE STEELWORK UNDER ITS OWN SELF-WEIGHT AND THAT OF THE GRC CLADDING.

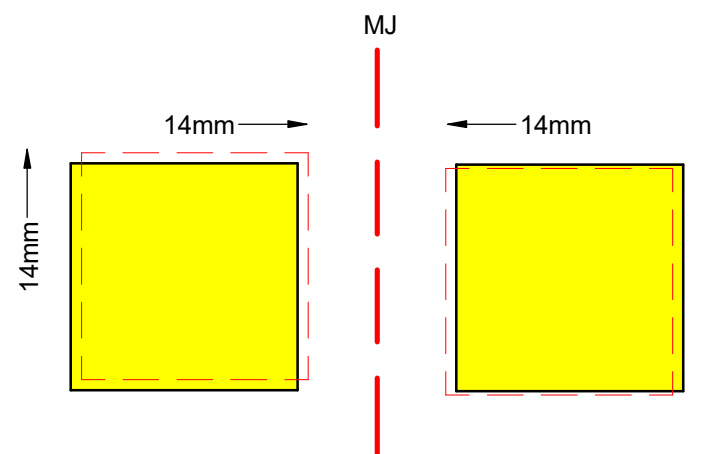
THE MOVEMENTS GIVEN ARE BASED ON THE WORST CASE JOINT EXPANSION, CONTRACTION AND VERTICAL DISPLACEMENT OF THE MOVEMENT JOINTS.



PLAN DRAWING SHOWING MOVEMENT JOINT LOCATIONS SHOWN IN RED



MAXIMUM JOINT EXPANSION







MAXIMUM JOINT CONTRACTION

ELEVATION OF GRC CLADDING MOVEMENTS AT TYPICAL MOVEMENT JOINT (EXCLUDES STEEL AND GRC SELF-WEIGHT)

THE FIGURE ABOVE SHOWS TWO ADJACENT CLADDING PANELS OVER A MOVEMENT JOINT. THE RED DASHED LINE REPRESENTS THE DISPLACED POSITION OF THE CLADDING PANEL AS DICTATED BY THE MOVEMENT OF THE STEEL FRAME.

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PROJECT		<div><div><div>قطار الرياض</div><div>riyadh metro</div></div><div></div></div>		BACS CONSORTIUM		<div><div><div></div><div>BACS</div><div>RIYADH METRO PROJECT</div><div>www.bacsrmp.com</div></div></div>		<div><div><div></div><div>This drawing has been Approved and Certified as acceptable on behalf of the BACS Consortium.</div></div></div>		SCALE		As indicated		PAPER SIZE		A1		DRAWING TITLE		DEEP UNDERGROUND STATION LINE 1 - TRANSFER STATION 1F4 FACADE SUPPORT STEELWORK STRUCTURAL MOVEMENTS & TOLERANCES - SHEET 3	
CLIENT		<div><div><div></div><div>الهَيئة العامة لتطوير مدينة الرياض</div></div></div> <div>© 2015 High Commission for the Development of ArRiyadh</div>		LEAD DESIGN ENTITY (LDE)		APPROVED BY LDE		DRAWN BY		CHECKED BY		APPROVED BY		CONSULTANT / SUB-CONTRACTOR		ISSUED FOR CONSTRUCTION		DRAWING NUMBER		REVISION	
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