

Appendix C: Blank Worksheets

The following pages contain facsimiles of all blank worksheets needed by an inspector performing a ROOFER steel panel roof evaluation. Photocopy them for use in the field.

Included at the end of the appendix is a field reference guide for flashing and panel distresses.

BUILDING IDENTIFICATION SHEET		AGENCY / INST. NO.:	
DATE: ____/____/____		AGENCY / INST.:	
BUILDING NAME:			
BUILDING NUMBER:	DESIGN CATEGORY CODE:		
TYPE CONST.:	FACILITY NUMBER:		
LOCATION:			
USE:		YEAR BUILT:	
ROOF SECTIONS:			
A _____ SF	F _____ SF	K _____ SF	P _____ SF
B _____ SF	G _____ SF	L _____ SF	Q _____ SF
C _____ SF	H _____ SF	M _____ SF	R _____ SF
D _____ SF	I _____ SF	N _____ SF	S _____ SF
E _____ SF	J _____ SF	O _____ SF	T _____ SF
REMARKS:			
BUILDING ROOF PLAN SCALE:			

ROOF SECTION IDENTIFICATION		AGENCY/INST.:	
DATE: ____/____/____	BLDG NO:	SECTION ID:	AREA: _____ SF
OCCUPANCY:	YEAR ORIG. CONST.:	YEAR LAST REPLACED:	
10 GENERAL			
11 TYPE:			
12 ACCESS:			
20 STRUCTURAL FRAME			
21 TYPE:			
30 ROOF DECK			
31 STRUCTURAL DECK:			
32 ATTACHMENT SURFACE:	33 SLOPE: _____ IN 12	34 DRAINAGE:	
40 UNDERLAYMENT			
41 TYPE:			
50 ROOF COVERING			
51 TYPE:			
52 BASE METAL:			
53 PANEL FINISH:			
54 PANEL ATTACHMENT:			
60 FLASHINGS			
61 TYPES:	62 ACCESSORIES:	63 OVERLAY: Y/N/UNKNOWN _____ # OF LAYERS	
70 REMARKS:			

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32	ATTACHMENT SURFACE (if applicable):		
	WOOD DECK	WOOD BATTENS	OTHER
	☐ OSB Panels	☐ WOOD FRAMING	
	☐ Plywood Panels	☐ METAL PURLINS	☐ UNKNOWN
	☐ Planks		
	☐ Boards		
33	SLOPE (primary): _____ IN 12 (1/8" increments up to 1"; 1/2" increments thereafter)		
34	DRAINAGE (check all):		
	☐ ROOF EDGE	☐ SCUPPERS	☐ INTERIOR GUTTERS
	☐ GUTTERS & DOWNSPOUTS	☐ SCUPPERS W/LEADER & DOWNSPOUTS	☐ INTERIOR DRAINS
		☐ OVERFLOW SCUPPERS	☐ OTHER
<u>40 UNDERLAYMENT</u>			
41	TYPE (check all):		
	☐ UNKNOWN	☐ ASPHALT SATURATED SHEET	☐ OTHER
	☐ FULLY-ADHERED ICE & WATER PROTECTION MEMBRANE	☐ HIGH PERFORMANCE NON-ASPHALT SLIP SHEET	☐ NONE
<u>50 ROOF COVERING</u>			
51	TYPE (check one):		
	METAL PANEL - STANDING SEAM		
	SEPARATE CAP	☐ METAL PANEL LAP SEAM	
	☐ Snap-on	☐ FLAT SOLDERED SEAM	
	☐ Batten	☐ METAL PANEL SHINGLE	
	☐ T-Style	☐ OTHER	
	MECHANICALLY INTERLOCKED		
	☐ Double lock seam		
	☐ Single lock seam		
	INTEGRAL CAP		
	☐ Snap lock		
	☐ Integral batten		
	☐ Integral standing seam		

52	BASE METAL: ☐ ZINC COATED STEEL ☐ (galvanized) ☐ ZINC-ALUMINUM ☐ COATED STEEL ☐ STEEL ☐ ALUMINUM ☐ TERNE ☐ COPPER ☐ STAINLESS STEEL ☐ ZINC ☐ LEAD ☐ LEAD COATED ☐ COPPER ☐ UNKNOWN		
53	PANEL FINISH: ☐ FACTORY APPLIED SMOOTH ☐ FACTORY APPLIED STONE COATED ☐ MAINTENANCE COATING ☐ OTHER ☐ NONE ☐ UNKNOWN		
54	PANEL ATTACHMENT: ☐ CONCEALED CLIPS ☐ EXPOSED FASTENERS IN PANELS ☐ OTHER		
60	FLASHINGS		
61	TYPES (Record lineal feet of each): ☐ EAVE ☐ RAKE EDGE ☐ RIDGE CAP ☐ HIP CAP ☐ VALLEY ☐ HEADWALL TRANS. ☐ SIDEWALL TRANS. ☐ CONTINUOUS ROOF TO WALL ☐ TRANSITION ☐ INTERIOR GUTTERS ☐ FLEXIBLE BOOT ☐ FLANGED METAL ☐ RAISED CURB ☐ PITCH PANS		
62	ACCESSORIES (check all): ☐ SNOW GUARDS ☐ WALKWAYS ☐ PHOTOVOLTAICS ☐ LIGHTNING PROTECTION		
63	OVERLAY: IS ROOF OVERLAYED ____ (Y/N/UNKNOWN) ____ # OF LAYERS		
70	REMARKS		

[illegible]

[illegible]

RCI CALCULATION SHEET		AGENCY/INST.:	
DATE: ____/____/____	BLDG NO:	SECTION ID:	AREA: _____SF

ROOF SECTION WITH METAL PANEL ROOFING

	VALUE	LOWEST	OTHER
PCI			
FCI			
		X 0.70	X 0.30
		(A)	(B)
		(A+B)	
		RCI	

RATINGS

86 - 100	EXCELLENT
71 - 85	VERY GOOD
56 - 70	GOOD
41 - 55	FAIR
26 - 40	POOR
11 - 25	VERY POOR
0 - 10	FAILED

Flashing and Panel Distress Field Reference Card

FLASHING DISTRESSES			FLASHING DISTRESSES (continued)		
Flashing Fasteners	FF M 1	missing or deteriorated flexible gasket, or fastener is corroded, improperly seated, or has a sealant repair but is watertight	Ancillary Flashing	AF L 1	curb/coping cap flashing is deformed with ponding at a location not adjacent to a lap or seam, or counterflashing is deformed
	FF H 1	fastener or flexible gasket is loose, deteriorated or missing or enlarged hole, and allowing water to penetrate		AF L 2	elastomeric bellows expansion joint cover exists
Flash Surface Defect	FD M 1	localized loss of finish or metal corrosion		AF M 1	holes on a vertical surface
Panel Closure	PC M 1	misaligned but watertight		AF M 2	unflashed or improperly flashed penetration passing through it but is watertight
	PC M 2	pre-manufactured seam cap does not fit properly		AF H 1	holes or severe deterioration on a horizontal surface
	PC H 1	non-metal panel closure is deformed, misaligned, damaged or missing, allowing water to penetrate		AF H 2	missing or deformed, or ponding at a lap or seam
	PC H 2	metal panel closure is deformed, misaligned, or missing, allowing water to penetrate		AF H 3	displaced
Eave Flashing	EA M 1	displaced but is watertight		AF H 4	failed soldered joint, an open joint, a butt joint, or missing joint covers
	EA H 1	holes		AF H 5	joints that are bucking water
	EA H 2	non-cleated eave is displaced and allowing water to penetrate		AF H 6	sealant at reglet, top of counterflashing or sealed joint is missing or no longer functioning
	EA H 3	cleated eave is displaced or disengaged		AF H 7	counterflashing, exterior siding, or cladding does not extend over top of transition flashing
	EA H 4	open joints or butt joints		AF H 8	curb/coping cap has unflashed or improperly flashed penetration passing through it that is allowing water to penetrate
Rake Edge Flashing	RE M 1	loose or displaced but watertight and does not compromise panel securement	Flashing Patch	AF H 9	top of transition flashing is not properly counterflashed or terminated
	RE H 1	holes		FR L 1	patch appears to be to be watertight and does not require a permanent repair
	RE H 2	loose, displaced or missing and is allowing water to penetrate and/or compromises panel securement		FR M 1	patch appears to be watertight and does require a more permanent repair
	RE H 3	installed so that water is running against lap		FR H 1	patch is allowing water to penetrate
Ridge Cap, Hip Cap	RE H 4	open joint or butt joints	PANEL DISTRESSES		
	CP M 1	disengaged but is watertight	Section-Wide Surface Deterioration	SW L 1	applied finish exhibits chalking, fading or scratching over the entire roof section, but no underlying corrosion
	CP H 1	holes		SW M 1	base metal or applied finish exhibits chalking, fading or scratching over the entire roof section; requiring a coating or surface treatment
	CP H 2	deformed or disengaged and allowing water to penetrate, or evidence of ponding at a lap or seam		SW H 1	base metal exhibits corrosion over the entire roof section; requiring a roof replacement
	CP H 3	missing	Localized Surface Deterioration	SD M 1	localized loss of applied finish or localized metal corrosion
Valley Flashing	CP H 4	joints that are bucking water		SD M 2	panel finish exhibits degradation caused by grease, solvent or oil drippings
	CP H 5	open joints or butt joints		SD H 1	for mech. interlocked seams, panel has corrosion holes; requiring localized repair
	VF L 1	fastener is located in the valley but is watertight	Panel Fastener Defect	SD H 2	panel finish exhibits degradation caused by grease, solvent or oil drippings
	VF L 2	patch is watertight		PF M 1	fastener has missing or deteriorating flexible gasket or fastener is corroded, improperly seated, or has a sealant repair but is watertight
	VF M 1	fastener has missing or deteriorated flexible gasket but watertight; or fastener is corroded, improperly seated, or temp repair		PF H 1	fastener, flexible gasket and/or metal washer is loose, deteriorated or missing or has large hole around it allowing water to penetrate
	VF H 1	fastener or flexible gasket is loose, deteriorated or missing and is allowing water to penetrate, or fastener has an enlarged hole	Damaged Panel	DP L 1	panel is dented, deformed, or kinked with no deformation of the seam, no loss of coating and no corrosion; and is watertight
	VF H 2	holes		DP M 1	panel is dented, deformed or kinked, allowing ponding water and/or corrosion
	VF H 3	open joints or butt joint, or joints that are bucking water		DP H 1	for mech. interlocked panel system, panel has holes, splits or tears, requiring localized repairs
Headwall Transition Flashing	VF H 4	panel end that terminates in valley has become disengaged	Displaced Panel	DP H 2	for non-mech interlocked systems, panel has holes, splits or tears that require panel replacement
	VF H 5	patch is allowing water to penetrate or is inappropriate		DL H 1	panel is loose or displaced, requiring repositioning and re-securement
	VF H 6	missing		DL H 2	panel is missing and requires replacement
	VF H 6	missing	Panel Patch	PA L 1	patch appears to be watertight and does not require a more permanent repair
Sidewall Transition Flashing	HT M 1	disengaged or loose but watertight		PA M 1	patch appears to be watertight and requires a more permanent repair
	HT H 1	holes		PA H 1	patch is allowing water to penetrate
	HT H 2	disengaged or loose and allowing water to penetrate	Debris and Vegetation	DV M 1	collection of foreign objects or vegetation or grease, solvent or oil drippings on the roof which cause no degradation
	HT H 3	missing or deformed and allowing water to penetrate		DV M 2	tree branches making contact with the roofing system
Continuous Roof to Wall Panel Transition	HT H 4	open joints or butt joints, or joints that are bucking water		EQ L 1	rated low severity as a minimum
	ST M 1	disengaged or loose but appears to be watertight	Improper Equipment Support	EQ M 1	support is bolted or fastened through the metal panel seam flashing and the bolt(s) are watertight
	ST H 1	flashing has holes		EQ M 2	support has caused damage to surrounding panels but is watertight
	ST H 2	disengaged or loose and is allowing water to penetrate		EQ H 1	support is bolted or fastened through the metal panel seams or flashing and allowing water to penetrate
Built-in Gutters	ST H 3	open joints or butt joints, or joints that are bucking water		EQ H 2	support has caused damage to surrounding panels and is allowing water to penetrate
	ST H 4	missing or deformed and is allowing water to penetrate	Mechanically Interlocked Seam	MS L 1	seam is deformed or flattened but still engaged and is watertight
	RW L 1	rated low-severity as a minimum		MS H 1	seam is open or allowing water to penetrate, or seam is disengaged
	RW H 1	loose, deformed or missing seam cover	Integral Cap Seam Defect	IC L 1	seam is deformed or flattened but still engaged and is watertight
Flexible Boot Flashings	IG L 1	gutter is lined with elastomeric membrane or coating and is watertight		IC H 1	seam is disengaged; requiring localized repair
	IG M 1	gutter is not lined with elastomeric membrane or coating and is watertight		IC H 2	seam is disengaged due to panel deformity; requiring panel replacement
	IG H 1	interior gutter is not lined with elastomeric membrane or coating and has holes, splits or open joints	Separate Cap Seam Defect	SC L 1	seam is deformed or flattened but still engaged, and is watertight
	IG H 2	gutter having elastomeric membrane or coating has holes splits or open joints		SC H 1	seam is disengaged; requiring localized repair
Flanged Metal and Raised Curb Flashing	IG H 3	gutter or drain is clogged		SC H 2	seam is damaged or missing; requiring cap replacement
	FB L 1	rated low-severity as a minimum	Lap Seam Defect	SC H 3	panel is damaged at seam location; requiring panel and cap replacement
	FB M 1	loose, missing, corroded or misaligned drawband		LS H 1	seam is open with no panel deformity; requiring localized repair
	FB H 1	boot is missing or has holes; or interferes with a panel seam and allowing water to penetrate	Transverse Panel Lap Defect	LS H 2	seam is open due to panel deformity; requiring panel replacement
Flashed Metal and Raised Curb Flashing	FB H 2	deformed securement ring that is allowing water to penetrate		PL M 1	for cleated end lap, panel is disengaged from cleat
	FB H 3	failed or missing sealant around the drawband allowing water to penetrate		PL M 2	end lap joint between panels has failed sealant or open fishmouths
	FM L 1	rated low-severity as a minimum	Integrated Skylight Panel Defect	PL H 1	panel lap is bucking water
	FM M 1	flange on upslope side is mounted on top of panel, bucking water, but is watertight		SP L 1	rated low severity as a minimum
	FM M 2	flange on downslope side is mounted below panel, bucking water, but is watertight		SP M 1	composite material exhibits visible fibers, significant discoloration or other signs of degradation
	FM M 3	sealant around umbrella is deteriorating, torn, or deformed, but is watertight		SP H 1	joint between skylight panel and adjacent metal panel is not watertight or bucking water
	FM H 1	flashing impedes drainage		SP H 2	holes, splits or tears; allowing water to penetrate
	FM H 2	holes			
	FM H 3	joint has failed and is allowing water to penetrate			
	FM H 4	flange on upslope side is mounted on top of panel and allowing water to penetrate			
	FM H 5	flange on downslope side is mounted below panel and is allowing water to penetrate			
	FM H 6	missing seam closure on downslope side			
	FM H 7	flange is open or unsealed			
	FM H 8	top of pipe flashing is open			
	FM H 9	sealant around umbrella is missing or is allowing water to penetrate			

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) David M. Bailey, Joseph E. Karbarz, and Katharine E. Sweeton				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
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14. ABSTRACT The US Army is responsible for maintaining millions of square feet of metal panel roofing on a wide variety of facilities. This type of roofing system shares a number of general characteristics with other types, but they use certain distinct types of materials that have their own specialized distress and degradation mechanisms. Dedicated inspection guidance and condition index calculation methods are needed to quantify the condition of an installation's metal panel roofing assets in order to make the best use of Army maintenance and repair resources. This manual was developed to serve as a standard reference for performing inspections and calculating a flashing condition index (FCI) and panel condition index (PCI) for use in facility maintenance management activities. This guidance represents a new implementation of the widely used ROOFER Sustainment Management System.					
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a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)