

St. Louis Audit of Fall Risks (SAFR) Administration Protocol

Worksite Visit Coordination & General Procedures

- 1) Observers
 - a) Work-site observations are made only by journeymen carpenters that have been trained using the Fall Hazard Audit Tool and this protocol.
- 2) Worksites
 - a) Sites at different stages of construction are audited, but the focus will be upon the framing phase due to the high prevalence of fall hazards during this phase.
 - b) The audit is designed for residential construction sites.
- 3) Contractors
 - a) The audit is appropriate for worksites from all sizes of contractors.
- 4) Pre-Visit Coordination
 - a) Site visits are coordinated with the contractor. Observer explains the purpose of the audit and the audit process, answer questions, and secures verbal consent from the contractor. If requested, the observer will provide the contractor with the audit instrument via fax, e-mail, or US mail.
 - b) The observer and contractor set the week for the visit, if contractor requires an appointment the observer makes an appointment for a specific day and time. The contractor will provide the observer with location of construction site and contractor representative's name.
 - c) The contractor informs the contractor representative at the worksite of the visit.
 - d) The contractor representative informs the crew that there will be a carpenter observing them work as part of a study being conducted at the Carpenters' training program.
- 5) Site Entry
 - a) Upon reaching the observation site, the observer immediately notifies the contractor representative and explains the purpose of the visit. The observer explains the process of the audit and answers any questions.
 - b) The contractor representative may choose to accompany the observer during the site audit. If so, the observer may briefly explain the data collection process.
 - c) If the contractor representative at each dwelling location is a different person, the observer notifies each contractor representative and explains the purpose of the visit.
- 6) Observer Safety
 - a) The observer inquires about any site specific safety rules related to their presence on site, such as Control Access Zones. While on site visits, the observer will wear appropriate work attire (work clothing, boots, hard hat, safety glasses, and ear plugs when required). General and site specific safety rules will be followed at all times. The observer will perform the majority of the audit from ground level, or first/second floor of house.
- 7) Follow-Up with Contractor
 - a) Thank you letter to each Contractor participating in the project will be sent after all of the audits for the contractor have been performed.

Data Collection

1) Audit Administration Process

- a) One audit is completed per worksite; however, if the auditor observes two different crews at one site, two separate audits are completed. These two crews may be working at the same time (a siding crew and a dry wall crew both observed on one day), or working at different points in time on the same structure (a framing crew observed one week and a siding crew observed the following week on the same worksite).
- b) The SAFR includes general information about the construction site, fall hazard indicators that are grouped into categories, and a Brief Worker Questionnaire.
- c) The observer asks the contractor's representative several questions about the site (see General Information below) prior to completing the hazard audit.
- d) Observations are restricted to the specific categories and items on the audit.
- e) Audit items are completed while the observer walks around the work-site and observes the workers, equipment, and residence under construction.
- f) The observer assesses the construction area where the workers are working at the time of the audit.
- g) Only conditions or actions actually witnessed by the observer are used to score an item.
- h) Workers are not asked to perform, simulate, or repeat any task in order for an item to be scored.
- i) The observer will not interfere with the work being performed or interview the workers during the observation phase of this audit.
- j) After the audit is complete, the observer will administer the brief questionnaire to each carpenter and carpenter's apprentice working on the dwelling (see Brief Worker Questionnaire Below).
- k) No names or personal identifiers will be documented on the audit or Brief Worker Questionnaire.
- l) If the contractor representatives requests to know the results of the audit, the observer may share general impressions; however, observation or interview data that can be linked to an individual worker is not shared.

2) General Information Item Completion

- a) The general information is gathered through interview of the contractor representative and site observation.
- b) Dwelling identification number – the dwelling is assigned an identifying number based upon the size of the contractor, observer, and date of observation.
- c) Observer – the observer's name (or initials) is documented. If more than one observer is present (during training phase), each observer completes a separate audit form.
- d) Date – the date that the audit is performed is recorded.
- e) Start time – the start time is noted.
- f) Multi-site development - if more than one dwelling is in the development; such as in a new subdivision, this item is marked yes.
- g) Type of dwelling – a dwelling is defined as the home(s) lying within one continuous exterior structure. Single family, 2-3 family dwelling, or 4+ dwelling is noted.
- h) Type of construction – new or remodel renovation is marked.
- i) Stage of construction – the observer marks all stages of construction observed during the audit, input from contractor representative is requested to complete item if needed. If a stage other than those listed is observe, the observer marks other and describes the stage.

- j) Crew cycle time – the observer asks the site representative the total amount of time this crew will work on this dwelling and records in appropriate space, noting if days, weeks, or months.
 - k) Type of crew – ask the site representative what type of crew this is; such as framing, foundation, truss setting, roofing, etc. If the crew performs multiple operations note this in the space.
 - l) Number in crew observed – ask the foreman the number in the crew, including # of journeyman and apprentices; if a foreman is performing construction duties of the carpenters, he or she will be counted as a worker.
- 3) Fall Hazard Item Completion
- a) Observations will be restricted to the specific categories and items on the audit.
 - b) Specific criteria for evaluation are followed per below.
 - c) Only conditions or actions actually witnessed by the observer will be used to score an item.
 - d) Responses will be made on every item of the audit.
 - e) Yes will be circled if every instance of the item observed met the criteria described.
 - f) No will be circled if at least one instance of the item observed did not meet the criteria.
 - g) All No ratings require a brief description of the work practice observed under the comments section.
 - h) For each item that was not observed as the construction was not at the phase, Not Seen, “NS” will be recorded in the comment section. If an entire category of the audit was not observed, the box next to the category name is marked with an X.
- 4) Specific Item Completion
- A) General Safety Climate & Housekeeping
 - 1) Hard hats – all workers at this dwelling must wear a hard hat in order to receive a yes rating. If a worker is observed without a hard hat while work is being done, No is marked and comments are made.
 - 2) Safety glasses – all workers at this dwelling must wear safety glasses or other form of eye protection in order to receive a yes rating.
 - 3) Pathways & Access points – observe walkways/access points both inside the home and in areas workers must frequently access to see if they are clear of objects or conditions that could cause slip, trip, or projectile hazards, if so mark yes. If any hazards are noted, no must be marked and the specific hazard identified in comments.
 - B) Floor joists & sub-floors installation
 - 4) Floor joist installation – the method of floor joist installation is observed to see where the workers are positioned while setting and securing the floor joists. No worker should be on the beam or top plate if yes is marked. Workers should be working from the ground, ladder or scaffold. If it appears impractical to work from a ladder or scaffold, the item is still marked No, but the observer adds this to the comments.
 - 5) First sheet of sub-floor installation – must be installed from ground, ladder or scaffold in order to be marked yes; if installed from joist no is marked. As above, if it appears impractical to work from a ladder or scaffold to install this first sheet, No is marked and this is addressed in comments.
 - 6) Additional sheets of sub-flooring – should be installed from established deck; if worker stands on floor joists during installation, no is marked.
 - C) Walking Surfaces & Edges

- 7) Walking surfaces – work surfaces over 6’ above a lower level (ground or established floor of home) must be protected by guardrail if personal fall arrest is not used, this includes entry-points, edges, and openings in the floor or roof. If personal fall arrest is used, marked NS and note in comments that fall arrest is used, then complete items 51 and 52.
 - 8) Warning line – unprotected work surfaces over 6’ above a lower level (ground or established floor of home) must be identified with a warning line painted 6’ from the edge as soon as sub-floor is installed. Every leading edge must have this line to be marked yes. **If yes is marked, question #9 must be scored yes or no.** If a guardrail has been installed, this is no longer an unprotected surface; in this case Not Seen will be marked and the observer will rate in item #10 below.
 - 9) Controlled Access Zone – **all areas marked with a warning line are considered unprotected walking surfaces and must be designated CAZ’s.** In order to receive a Yes rating, all of the following conditions must be met:
 - a) Zones are properly marked with signs, wire, tape, or rope (the warning line marks the unprotected edge only; the entire zone must be properly marked)
 - b) Workers are monitored by foreman to ensure safety (foreman must be able to see workers in controlled access zone (CAZ), foreman is allowed to be working as long as he/she is also watching the workers in the CAZ).
 - c) Access is restricted. In order to receive a yes rating, all CAZ’s must be appropriately controlled at all times.

If all of the above conditions are not met, No is marked and the conditions not met are described in comments section.
 - 10) Guardrails – observe all guardrails protecting leading edges/holes/openings in floor, estimate height to ensure rails are at 42” and 21”. If guardrail is not in a CAZ, safely check guardrail construction to estimate if it could tolerate 200# of force.
 - 11) Holes – a sturdy hole cover should be present on all holes in floors that are in pathways commonly accessed by workers. A hole is defined as a gap over 2” in the floor or roof. A guardrail or CAZ may be used instead of a hole cover; if this is the case this item is marked NS, comment is made about guard rail, and item #10 above is scored.
 - 12) Stairwell – observe for handrail on at least one side of stairwell, and safely check construction of handrails. If no rail is present No is marked and comments are written.
- D) Wall Openings: namely window and door openings
- 13) Wall openings – walls that are >6’ above lower level and have openings that are under 39” from the floor surface must be protected by a guardrail. If wall has just been raised, observe workers to see if they install guardrail shortly afterward. If wall openings are less than 6’ above a lower level, this item is marked Not Seen even if guardrails are in place, as the guardrails do not need to be present. If guardrails are present in wall openings less than 6’ from lower level, and these guardrails appear to be posing a trip hazard for workers, Not Seen is still marked as the guardrails do not need to be present, the hazard from the unnecessary guardrail is described in comments; such as the case when a guardrail is protecting a frequently accessed doorway that is less than 6’ from the lower level.
 - 14) Guardrails – observe all guardrails protecting wall openings that are >6’ above lower level, estimate height of rails to see if at 42”. A mid-rail must be positioned at 21” if the wall opening is <21” from floor surface. If guardrail is not in a CAZ, safely check guardrail construction to estimate if it could tolerate 200# of force. Not Seen is

- marked if guardrails are present over openings less than 6' from lower level as these guardrails are not necessary. If guardrail(s) are not constructed sturdily, mark No and describe the deficiency in comments
- E) Truss Setting
- 15) Truss preparation & lay out – workers marking top plates and preparing top plates for truss installation must be standing on sub-floor, ladder or scaffold, not top plate. Comment on all No ratings.
 - 16) Truss installation if wall height is up to 8' – workers installing trusses must be standing on sub-floor, ladder or scaffold, not top plate. Comment on all No ratings.
 - 17) Installation of first two trusses if wall height is over 8' – first two trusses must be set from ladders, after truss is set a worker may climb onto the interior top plate to secure the peaks; however this worker must have no other duties during truss erection. If any of these conditions are not met, No is marked and the truss installation methods are described in comments.
 - 18) Installation of common trusses if wall height is over 8' – common trusses are set and secured from ladder, scaffold, or interior top plate if previously stabilized truss/rafter is used as a support and worker has no other duty other than truss installation. If any of these conditions are not met, No is marked and the truss installation methods are described in comments.
 - 19) Removing chain/webbing – workers must stand or climb on ladder or secure truss to detach truss from crane, workers must also maintain hand-hold on stable surface as much as possible in order for Yes to be marked. If one of these conditions is not observed, No is marked and conditions are described in comments.
 - 20) Lifting boards & standing trusses – workers standing on the interior top plate, truss, or rafter will maintain hand-hold on a stable surface when standing trusses and lifting boards and supplies. If worker does not hold onto stable truss, mark No and comment.
- F) Roof Sheathing: applies to installation of wood sheathing to the roof, not shingles / paper
- 21) Bottom row of sheathing installation – if workers install the bottom row of roof sheathing from ladder, scaffold or truss web this item is scored Yes, if installed from top plate, leaning out of structure, or in another unsafe manner, mark No and explain.
 - 22) Slide guard installation – workers must install the slide guard on the 1st row of roof sheathing before any higher rows of sheathing are installed to receive Yes rating.
 - 23) Slide guard construction – slide guards must be constructed with 2 x 4 boards with the bottom guard positioned perpendicular to the sheathing for Yes to be marked.
 - 24) Intervals of slide guard – determine the roof pitch through observation or questioning of foreman. If pitch is 9 in 12, slide guards must be placed at 13' intervals; however if pitch is over 9 in 12, slide guards must be positioned at 4' intervals for Yes rating. Describe observations for No ratings. If all workers on roof are using personal fall arrest, slide guards are not required and Not Seen is marked and items 27, 51, and 52 are completed.
 - 25) Presence of guards on all roof surfaces – if workers are working on the roof for sheathing operations (not shingling), observe the perimeter of the home to view all roof surfaces. Slide guards must be installed across the full width of the roof on all sides to be scored Yes. If there are gaps apparent in the slide guards, mark No. If workers are not on the roof or workers on roof are using personal fall arrest, mark Not Seen and complete items 26, 51, and 52.
 - 26) Roof housekeeping – if workers are present on the roof, observe the conditions of the roof surface from below to assess for any debris, sawdust or weather conditions; such

- as dew, snow, or ice on the roof. If any of the above is noted, No is marked and the condition present is explained in Comments. If workers are not present on the roof mark Not Seen.
- 27) Fall arrest if slide guards not used – if slide guards are not in place and workers are on the roof performing roof sheathing (not shingle or paper installation), observe to see if workers are using fall arrest (harness and lanyard), if so mark Yes and answer questions 51 and 52.

G) Ladders

- 28) Ladder condition – observe all ladders that workers are using or appear set up to be used for their condition for warping, cracks, broken parts, mud or ice, and absence of side locks on step ladders. If any of the above are noted record No and describe specifically in Comments.
- 29) Secure at base – observe the base surface that all ladders that are positioned for use and positioned upon. Step ladder should be set up on solid surface with all feet in a level position. Extension ladders should be firmly planted in the surface and be level. If all ladders meet these criteria, mark Yes, if not, mark No and explain the ladder and its problems.
- 30) Secure at top – if extension and/or job-built ladders are positioned for use, they must be secured at the top in an adequate manner, such as secure board, nail, or hook to receive a Yes rating.
- 31) Step ladders use – observe all step ladders workers are using or appear to be positioned for using to see if they are opened fully and side locks are fully engaged, if so mark Yes. If step ladder is leaned on a structure in the closed position so it can be used like a straight ladder, mark No. Describe all No ratings in Comments
- 32) Extension ladder angle – all extension ladders and job-built ladders must be set at correct angle of 1:4 ratio as assessed by observation or testing (stand with toes at base and reach hands to side rails, if palms reach side rail, rate Yes). If ladder is at an angle that is much less or greater than this 1:4 ratio, mark No and estimate the ratio in Comments.
- 33) Overhang of extension ladders – all extension ladders should be set up with 3' overhang past the landing surface (3 rungs = 3') in order to mark Yes, if under 3' mark No and describe degree of overhang in Comments.
- 34) Top 3 rungs not used - during the time spent at the worksite; observe each instance that a worker uses a ladder to see how far up on the ladder workers climb. If workers climb on or work on the top 3 rungs of an extension or job-built ladder or the top run or platform of a step ladder, mark No and explain. Only one instance is required for a No rating to be assigned.
- 35) Climbing behavior – during the time spent at the worksite, observe each instance that a ladder is used for the technique the worker uses when climbing. If all workers maintain 3 points of contact every time ladder climbing is observed and do not carry on ladder, mark Yes. If one rung is climbed without 3 points of contact or a worker carries while climbing the ladder, mark No and describe in Comments.
- 36) Ladder behavior – during the time spent at the worksite, observe each instance that a worker uses a ladder to see how worker is positioned on the ladder. If the belt buckle is consistently positioned within side rails and both feet are kept on ladder when standing or working on ladder, mark Yes. If this is not consistently observed, mark No and describe observations in Comments.

- 37) Safe climbing – if mud is present during the audit, observe each instance that a worker uses a ladder to see if workers consistently drag mud off of their shoes or boots prior to climbing the ladder. If an attempt to remove the mud is always made, mark Yes, if not mark No and describe.

H) Scaffolds

- 38) Fall protection with all scaffolds – observe all scaffolds at the worksite; ensure that for scaffolds that are over 10’ tall that are not protected with proper handrail, workers are wearing personal fall arrest (harness & lanyard). If at least 1 worker that is working on unprotected scaffold that is over 10’ tall is not using fall arrest, mark No and describe in Comments. If all workers at 10’ are wearing fall arrest, mark Yes. Not Seen is marked only if there are no scaffolds over 10’ tall.
- 39) Ladder jack set up – observe the base surface that both extension ladders holding walk board are set up on, and the top of the extension ladders for securement. Ladders should be firmly planted in the surface and be level. Ladders must be secured at the top in an adequate manner, such as secure board, nail, or hook. Both ladders must be secure at base and top to rate Yes, if not, mark No and explain the problem.
- 40) Ladder jack height – observe the height of the ladder jack to estimate the height, if ladder jack is 20’ high or less, mark Yes, if over 20’ high mark No and list height in comments.
- 41) Ladder jack walk board – observe width of ladder jack walk board, if unable to tell from the ground and workers can easily converse, ask the worker the width of the board. If board is 12” or wider, mark Yes, if less than 12” mark No and list width in comments.
- 42) Ladder jack access ladder – observe set up of walk board on ladders. If walk board is outside of the ladders a third ladder is required for access to the walk board. If walk board is outside of ladders and third ladder is present, mark Yes, if walk board is outside of ladders and third ladder is absent, mark No. If walk board is between ladder and house a third ladder is not needed, Not Seen is marked.
- 43) Ladder jack access ladder overhang – if walk board is outside of ladders and an access ladder is present, the access ladder must extend at least 3’ above the walk board, if it does, mark Yes, if it is less than 3’ mark No. If there is no access ladder, mark Not Seen, even if an access ladder is required, as that question is answered in #42.
- 44) Pump jack set up – observe the base surface that both poles are positioned upon for stability of the set up. Poles should be positioned on a firm surface that is level and must be secured adequately to mark Yes, if not mark No and describe in comments.
- 45) Pump jack construction – observe posts of pump jack; posts should be constructed of 4 x 4 materials that are braced at appropriate distances and firmly secured to the home. If posts meet this criteria, mark Yes, if not mark No and describe in comments.
- 46) Pump jack height – observe the height of the pump jack to estimate the height, if pump jack is 50’ high or less, mark Yes, if over 50’ high mark No and list height in comments.
- 47) Pump jack brake use – observe both workers as they lower the scaffold, if only one worker disengages the brake at a time, mark Yes, if both workers disengage the brake at the same time, mark No. If workers are not lowering the scaffold, mark Not Seen.
- 48) Job-built set up – observe any job-built scaffolds or other scaffolds at the work site, if scaffold is set up on level surface and stable footing, mark Yes, if not, mark No and describe. If scaffold has wheels and they are not locked, mark No.

- 49) Job-built platform secure – observe any job-built scaffolds or other scaffolds at work site to determine the stability of the scaffold construction, if stable mark Yes, if not mark No and describe in comments.
- 50) Job-built platform – observe the platform width of job built scaffolds, if 18” wide or greater, mark Yes, if less than 18” wide, mark No and describe.
- I) Personal Fall Arrest
- 51) Approved harness and anchorage – this item is used to grade all personal fall arrest observed during work site visit. If all harnesses in use have approved leg straps and O-ring and are worn properly by all workers, mark Yes, if one harness in use is not approved or worn properly, mark No and describe in comments.
- 52) Lanyard anchorage – observe the anchorage point for lanyard of all personal fall arrest observed during work site visit. If anchorage point allows for adequate length for lanyard to break the fall and anchorage point is secure, mark Yes, if not, mark No and describe in comments.
- a) Weather Conditions – observer notes the current weather conditions; if a condition does not exist “Not observed” is marked. If a weather condition does exist, if work is appropriate for the degree of the weather condition present, yes is marked. No is marked when weather conditions are inappropriate for the work being performed at the work site. For each item marked no, comments are included.
- b) Mud
- c) Wind
- d) Snow
- e) Rain
- f) Ice
- g) Heat
- 5) Time that it took to complete the 52 audit items is completed is logged.
- 6) Observer’s Assessment – after completing the audit, the observer reflects on the observations to form an overall assessment of the home construction site and records in this space.
- 7) Additional Notes – observer describes any conditions not covered on audit or to highlight observations made during the audit.
- 8) Brief Worker Questionnaire
The Brief Worker Questionnaire will be administered to each carpenter and carpenter’s apprentice after work site observations are complete. Verbal consent must be secured from each participant. The observer will read the consent script and consent will be documented by checking the “consent received” item on the Questionnaire. If a subject does not consent, No is marked and the Brief Questionnaire is not performed. If a subject requests a copy of the verbal consent document, the observer will provide a duplicate to the subject.
- 9) Time the entire audit and interview process is complete is logged on audit form.

Data Confidentiality

- 1) Prior to performing the audit, the observer will assign a dwelling identification number based upon contractor size and observers name to each dwelling site. The name of the contractor, subdivision, development, and street address will not be recorded on the audit.
- 2) The Brief Worker Questionnaires will be identified by this dwelling identification number only. The worker’s name is not known to the observer or recorded on the questionnaire. Since the workers age, time with employer, term of apprenticeship or journeyman status are noted on the interview, the observer will ensure that the questionnaires are secure and never out of his possession while at the work site.

- 3) If the contractor representative at the work site requests to know the results of the audit(s), the observer may share general positive impressions; however, observation or interview data that can be linked to an individual worker is not shared.
- 4) If the contractor requests to know the results of the audit(s), the observer may share general positive impressions; however, audit information will not be linked to a specific dwelling, work site, foreman, or contractor representative and interview data will not be shared.
- 5) Observers will store completed audits and Brief Worker Questionnaires in a confidential manner.
- 6) Investigators will store completed audits and questionnaires in a locked cabinet.
- 7) Data entered into electronic database is stripped of all identifying information and in a secure database.
- 8) Observers will keep a written record of the dwelling identification numbers and the name of the contractor and subdivision or address. This will be kept secure and separate from the completed audits. The investigators will be given this information at regular intervals and transfer to a secure database. This database will be completely separate from the audit and interview database.
- 9) Observers and investigators will not share information about specific contractors, representatives, foremen, or workers with anyone.