



## Article Side

How to Build a Garage: Construction Costs, DIY Garage Plans, Building Design, Builder Prices by [Audrey Pena](#)

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Learning how to build a garage is not as daunting as one would expect, well, for detached structures at least. Homeowners who build their own garage can save thousands over hiring a builder who, in many cases, will subcontract to the same construction crews that you can hire. Or if feeling adventurous, or just downright thrifty, one can invite friends over for a few beer over the weekend and put them to work.

There many items to consider while in the early planning stage such as:

Garage size: One car, two car, or even a three car garages can be designed with various sizes, but the lot and homeowner's budget are generally the limiting factors. Local building codes vary, but typically a structure must not encroach within eight feet of property lines in rural areas and from zero to four feet in city limits. Detached garages must also be set back from other buildings by a minimum of eight feet, but this must be confirmed with local building offices as bodes vary. One important consideration is roof overhang. Eave and gable end overhangs are typically 12" - 24" (although less than 12" is common in windy areas) and must be considered when determining garage size and placement.

One method of determining the perfect size is to add 12" to 15" of width for each vehicle. If planning to use the sides of the garage for storage this will require another two feet of width per side. The length should be a minimum of 22" and add four to ten feet for a work bench and storage. A two car garage could be calculated as  $2 \times 12" + 4"$  for storage along each wall =  $28" \times 22"$  long without a work bench.

Common garage sizes include:

1. One car: Common sizes include  $12" \times 24"$ ,  $14" \times 24"$ , and  $16" \times 24"$ . A length of twenty feet is pretty much the minimum if you have a full size truck and even with a small or mid-size car there will be little wiggle room at twenty or twenty two feet.

2. Two car: The most common garage size in many states and provinces is  $24" \times 24"$  because many building codes required an engineered drawing and two inspections by a structural engineer for concrete floating slabs (monolithic) larger than this size. If space is scarce and the two cars are small to mid-size a 20" wide garage may adequate, but certainly not comfortable.

3. Three car: There are many three car garage sizes due to more room for numerous designs and homeowners often have larger budgets when considering these larger construction projects. Common sizes are  $36" - 42"$  wide by  $26" - 30"$  long.

Foundation: floating slab (monolithic) and slab with frostwall are the two most common foundation options. The floating slab is less expensive and easier to build, but often require an engineered drawing and two inspections for larger pads (i.e.  $24" \times 24"$ ). In cold weather climates many contractors install 2.5" foundation foam under the concrete to reduce heaving during freeze/thaw events. Engineered floating slabs in cold climates usually require this with an addition two feet extending out around the perimeter of the slab.

Adding  $6" \times 6"$  #10 wire mesh to the slab is an inexpensive method of increasing the floor strength and reducing cracking of the concrete. Most contractors install floating slabs with a thickened

concrete perimeter 12" x 16" thick around the outer 24" of the perimeter. Adding two rebar will increase the edges. Concrete strength should be a minimum of 3,000psi and many contractors use 4,000 and 4,500 psi as the additional cost is minimal. Another consideration is ordering concrete with fibermesh, and macro-synthetic fiber used for secondary reinforcement of concrete. Local concrete suppliers can provide costs for adding this to concrete. Slab thickness is dependent on the concrete strength and reinforcement designs, however a good rule of thumb is to pour a 4" or thicker slab.

Frostwall minimum depth is determined by local building codes and is typically 48" in cold climates and 36" in more moderate areas. Once the trench is excavated a footing approximately 12" wide by 8" thick is formed and poured and a keyway is etched the length of the footing to prevent movement of the concrete wall. The frostwall is formed and poured on top of the footing and anchor bolts are installed in the top to attach the walls to the foundation. The concrete slab is then poured to designed thickness. Obviously this foundation system requires more time and expense.

Wall construction: If the garage is going to be insulated now or possibly any time in the future the wall studs size is important as 2" x 6" studs allow more insulation that can meet building code requirements (for garages with apartments) than 2" x 4" studs. Of course, 2" x 6" studs are stronger which results in a more structurally sound building.

Walls height: Walls are generally 8', but 9' and 10' walls are common. In city downtown areas there is often a height restriction on structures, such as less than 16' to the roof peak based on the average height from the four corners measuring at grade. This means that you can get a little extra height if the garage is nestled into a bank with a concrete curb or retaining wall on this end and backfilling to top of retaining wall. Another method to maximize height in these areas is to pour a 12" concrete curb on the concrete slab perimeter and backfill earth up to the top of the curb and grade away from the structure. This method can gain 12" of height while still meeting the height restrictions (confirm this with local building offices prior to implementing this strategy).

Garage door placement: The garage doors can be on the gable end or the eave side. A few things to consider:

1. Existing house design may dictate the direction of the roof line. A method to assist visualize this is to take a picture of the house and include the area where the garage will be built. Print two copies of the picture and hand draw in the garage using both the gable and eave options.
2. If the garage will be built in a cold climate the garage doors in the gable end is a better design as snow and ice will slide down the eave end.
3. Flexibility with the garage doors in the gable end allow height for a future car port.

Roof style: Often the roof style is dictated by the existing house, for example if the house has a hip roof this would be a good option for the garage. If this is a DIY project and the homeowner is building the garage it should be noted that a hip roof is more difficult to build than installing standard trusses. Roof pitch must be considered as well and often this should match the existing house. Roof pitch less than 4/12 (rises 4" for every 12" of run or length) is not recommended due to increased chance of water leaks. Higher pitch roofs with certain truss designs can allow for storage, loft, or even apartments above the main level. The most common roof trusses for garage roof design include:

1. Standard Fink: This is the most common residential truss.
2. Double fink: Designed to handle high weight loads for higher snow load requirements.
3. Attic: Common for designs that allow storage above the main floor. Access can be stairs or attic drop-down stairs and the option available may be dictated by local building codes.

4.Scissor: This options provides cathedral (vaulted) ceilings that provides more interior ceiling height. For example, a 24' x 24' garage with an 8/12 pitch may have a ceiling height of 12' in the center and 8' at the wall. This system is usually weighted against building with regular fink trusses and higher walls.

If this is a DIY garage project don't forget to order two gable trusses for each gable end. Otherwise two regular trusses will require wood filling for attaching sheathing and siding (not too mention the building inspector may not pass the framing inspection. If insulating the ceiling consider ordering "raised heel" trusses to allow adequate insulation between the wall top plate and the roof sheathing. This is the only way to meet many attic insulation level requirements (i.e. R40).

Garage plans: Once decisions are made on the above items it is time to get the garage plans for the building permit application and the builder. It is important to obtain good quality garage plans that are easy to follow, accurate, and provide a materials list (well, a material list is not important, but it will certainly save a lot of time). There are several websites that offer garage plans create by dozens and hundreds of different company so consistency and quality control are something to keep in mind. There are a couple of companies that do their own in-house drafting and a search of the internet should find these companies. Another option is to hire a local draftsman to create the garage plans.

Plot (plat) plan: The building compliance department will require a drawing showing (site plan) the lot with existing structures, proposed structure, and property lines with measurements indicating distances between property lines and structures. This can be a hand drawn diagram of a marked up copy of the plot/plat plan. The building department may require a survey to confirm accuracy of measurements for precise garage location requirements.

Building Permit: Make an appointment to meet with a building inspector to discuss the project and submit the garage plans, material list, and site plan to the building department. A building permit may be issued at this time or the building inspector will require a few days to a couple of weeks to review the documents.

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