

## **Building and Object modding v1.0 by:- Tangram**

This tutorial was originally released in June of 2005 and available on the former ESAclan forums, a considerable amount of work was undertaken to expand it further, however it still languishes on my hard drive and currently remains unfinished, this is the original version as previously posted at ESAclan.

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The main thrust of the tutorial is to encourage potential modders to create something new for the community. In order to maximise the potential audience the tutorial will include both creation from 2D and 3D sources as well as use of the Resource editor and some modding of the resultant xml files. Hopefully if time allows, all of this will get finished. If anyone wants to add any advice or participate in expanding the tutorial please feel free to join in or you can email me with your info and perhaps we can add it to the final PDF document as well as to this thread.

The tutorial makes considerable use of the original Blitzkrieg graphics, which are available for download from [http://gameswelt.de/search/spielinfos.php?title\\_id=1655&zone\\_id=1](http://gameswelt.de/search/spielinfos.php?title_id=1655&zone_id=1) look for 02.04.2003 Blitzkrieg - Project-Daten für den Ressourceneditor This is a huge 317MB download. Alternatively you could take screen shots of buildings from the map editor making sure to switch off viewing the terrain and displaying haze settings, this has some immediate problems as ideally you should have as high a resolution screen as possible otherwise you will lose image detail, you will also have difficulty separating building and building ground textures, shadows and in removing the green status bar placed above each building in the map editor. If you only need a few graphic images to get you started drop me an email and I'll send what you need.

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Before we go charging off looking for a 3D modelling package we should consider the way buildings, objects and related items are generated for Blitzkrieg. The first thing to consider is whether or not there is any need for working in 3D at all. The existing buildings were originally created in 3D, however the images generated for the game engine are only 2D sprites, as such they could just as easily be drawn in a 2D graphics package or similarly generated from scanned or digital photos. Another option is to use the existing buildings as template textures, copying, cutting, pasting and generally splicing the images together to produce a new building.

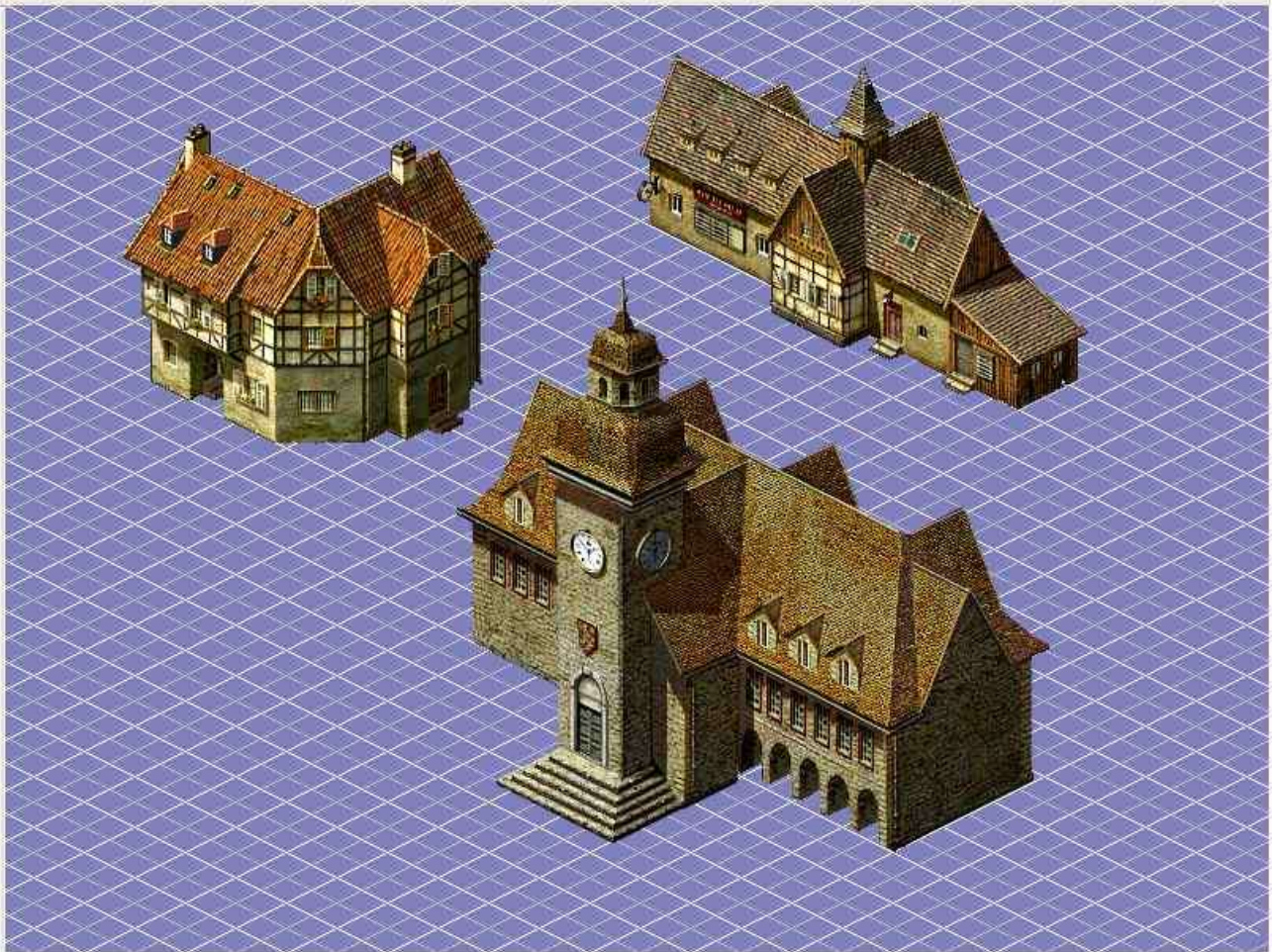
Within the tutorial I've tried to illustrate some of the problems that may be encountered while creating your mod, however this is not a tutorial on how to use any particular drawing, painting, 3D modelling, CAD or rendering package there are just too many options available for that. However I will attempt to break down some of the main points for each, in the main the 2D work has been done in PaintShop Pro 7, though not exclusively. The instructions are fairly general and equally apply in Adobe PhotoShop, Corel Photo-Paint, Ulead PhotoImpact, Serif Photo-Plus etc.

The 3D work was mainly done in AutoCAD 2000 and TurboCAD Pro, primarily because I use these professionally. Some work will have been done in any one of several 3D modelling packages (Modo, Amapi Pro, Hexagon (30 day trial versions of these 3 programs are available)). Rendering has been carried out in both CAD packages and in Gmax (Gmax is available for free download, you can also do the modelling in this package if you wish), the rendering package used must be able to render a 3D orthogonal view. Most if not all 3D packages will support perspective views (TrueSpace, Carrera etc.) but these will look very much out of place within Blitzkrieg but they will allow you to export your model and textures into a suitable package for that final render. There are also many early versions of 3D packages available for internet download or from magazine cover and book tutorial disks, as well as free and or extremely cheap programs such as Blender, MilkShape and Moray. If you're lucky enough to have access to an all in one, all signing, all dancing, modelling, texturing and rendering program like Max, Viz, Lightwave or Maya then you should make use of them, especially Maya since this should allow easy export of your model to the Blitzkrieg 2 format when it is released. The use of Maya PLE should be avoided, the save formats and render size are limited, renders are very badly watermarked (including alpha channels) though it may allow you a relatively easy route to create shadow/silhouette images and if you are thinking of making new vehicular units you're out of luck as PLE does not support Plugins.

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As already mentioned a 3D package is not required to make a building or object for Blitzkrieg but if you wish use one, the rendered image must be from a 3D Orthographic View, ideally with the ability to save the render as a TGA file in an ideal image size (being a multiple of 2, i.e. 512 x 512 pixels etc). If the image cannot be saved in this way, the rendered image can be screen captured from within most paint packages and saved in the required TGA format. Rendered image files in non TGA format (ie. bmp, tiff, gif) can also be easily opened and converted to TGA (note that saving to JPG is not recommended as you are likely to lose image detail, especially if the file compression depth is too much, also be aware of the limitations in colour depth of some file formats). The image will then have to be copied into a correctly sized TGA image of suitable size based on the 2 x 2 requirements. Models created in packages without a 3D ortho rendering view may be able to be exported to another package for rendering depending on file types supported.

The angle plane of the orthographic view may have to be tilted slightly so that it matches the Blitzkrieg ones. The Grid view below gives the correct viewing angle as seen by the placement of some existing buildings.



It should be noted that when working in either a 3D or 2D graphics package final rendered image dimensions should be in multiples of 2 pixels

ie 2 x 2  
2 x 4  
8 x 8  
64 x 64  
128 x 256  
512 x 512  
etc

Pixels per cm: 28

Pixel depth/colours: 24/16 Million ( ie. 16.7 million colours (24 Bits Per pixel) RGB colour).

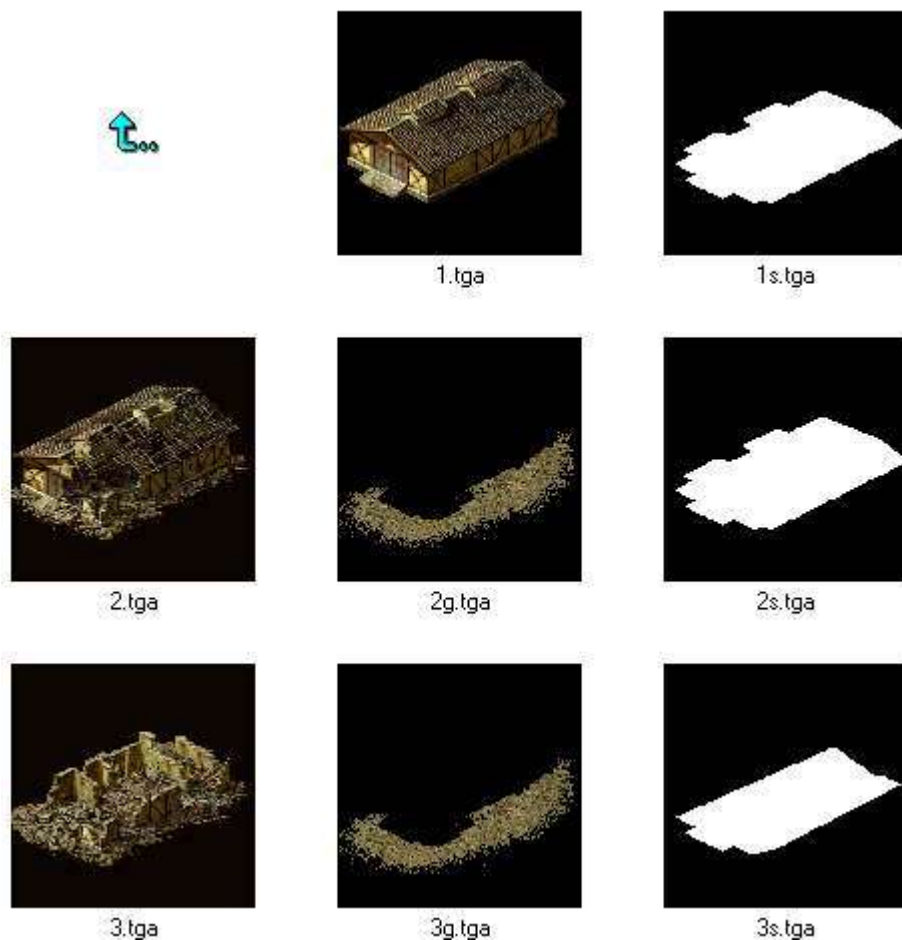
Number of layers = 1

Number of Alphas = 1 (Black RGB 0,0,0 being made translucent)

File type .TGA (Truevision Targa) Uncompressed

## The required files to create a building

Unfortunately making a building or object is rarely about making a single graphic image. First there is a complete building then a damaged and then a destroyed state. Objects and terrain pieces may have one or more images, while fences and bridges have a considerable number. Initially we'll constrain our thoughts to creating a building. Each of the damaged and destroyed building states also require a debris field image around them, these will be (2g.tga and 3g.tga) you could also make a 1g.tga if you wished to add some minor terrain texture feature around the building. We also require a silhouette (shadow) image for each of the 3 building states. That's at least 8 graphic images for each building and if you wish to add a winter textures you can double that.



Of some consolation the silhouette and ground debris fields can often just be duplicated or given minor adjustments and the destroyed winter buildings can be copies of the summer textures with the overall image being lightened and some snow textures added.

## **Number and type of images needed to produce a particular building or objects type.**

Terrain objects:- Dunes, ground, grass, coast, ravines, boarding, platform, flowers, bank, jetty etc 1 image only (i.e. 1.tga) does not normally require a silhouette or any damage textures

Terrain objects:-, craters, shell and death holes. 3 images, 1 for each season (1.tga, 1w.tga, 1a.tga) does not require a silhouette or any damage textures

Simple Objects 2 images:- 1 of object and 1 silhouette (i.e. 1.tga and 1s.tga) Silhouette acts as shadow area both below and to side of object.

Flora:- Trees and shrubs 2 images:- 1 of object and 1 silhouette (i.e. 1.tga and 1s.tga) Silhouette acts as shadow area both below and to side of object.

Buildings 3 images minimum, 3 of object (1 intact, 1 damaged and 1 destroyed) , for most buildings add 3 silhouettes, though ground based pillboxes & bunkers may not require them. You can also add a ground texture for each of the 3 building states though normally only the damaged and destroyed state will require one. So required image total may be anything between 3 to 9 images required, though normally 8 will do. This figure should be doubled if a unique winter texture set is required. Silhouette acts as shadow area both below and to side of object. Remember low to ground buildings such as pillboxes & bunkers normally do not require a silhouette as no discernible shadow would be cast

Bridges 18 images minimum:- 3 main decking images, start, middle & end plus a silhouette image for each, also each damage state requires a full image set (so multiply by 3 for intact, damaged & destroyed). Additional images are required for bridge sides if required (2 for each side, x3 for decking section, x3 for construction state, and all images should have a silhouette) likely total of 54 images per bridge. Silhouette acts as shadow area both below and to side of object, one for each bridge part. Image set will have to be doubled for different bridge angle and also for Winter or African texture sets if required.

Fences have at least 2 and often 4 orientation angles, 1 image set is required for each. Each angle starts with a complete fence section, a damaged left, a damaged right and a destroyed section, a silhouette image is required for each (note:- the destroyed section will normally become a ground section only and may not require a silhouette). Occasionally an additional 2 destroyed sections are required along with 2 silhouettes. Total number of fence images normally required 16, 20, 32 or 36 including silhouettes.

## Creating your first building from existing 2D resource images

I've used PaintShop Pro 7 for most of the 2D work (fully functioning demos are available for download) so if you have a different version or another program you should check your help file.

### Alpha channel selection

To cleanly extract any resource image from the original graphic, you should select the image using Alpha channel selection then copy and paste the resultant graphic into a transparent background

Using PaintShop Pro --- Selections / Load From Alpha Channel / select the correct mask image from the list (note: if you have other graphics open you may have several mask images available some an identical name, be careful). Copy and Paste your resultant graphic as a new image preferably with a transparent background. Save this image with a unique name we'll use this as one of our main source graphics.

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For this part of the tutorial I'm going to use 3 buildings from the Blitzkrieg, Resource pack, under Buildings, European, Summer.

E\_RailwayStation\_2

E\_Shed01\_3

E\_CTownHouse02\_1\_2

It's important to make sure you do not resize or scale any of the buildings or objects, if you need to enlarge the view use the zoom command and if a larger work area is required change the canvas or paper size. Most buildings are based on 256 x 256 pixel sizes however our final canvas size will be 512 x 512 pixels.



Individual sections of the building are selected using Freehand point to point or lasso selection. Each piece can be placed as a new layer on a large new canvas (with transparent background) for future selection and or alteration. It's probably best to keep feathering of the image and antialias switched off as we want as crisp an edge to our building pieces as possible.



The main component is the roof which we will use later, however removed walls, doorways etc may come in useful in other projects so saving them may be worthwhile.



We want to alter this roof and place it over our existing roof line, initially to see how our proposed building will look. Obviously looking at the image below, there are a number of problem areas that have to be dealt with before we even consider the roof.

1. The small wooden building needs removing.
2. The protruding central building needs to be removed.
3. The protruding roof line at the rear of the building has to be removed.
4. The roof line at the far end of the building is steeper pitched and it too will protrude above our new roof so it to must go.
5. Other items to go are the clock, notice board and the shadow cast by the central building section.
6. Most importantly what are we replacing the gaps in the wall with, doors, windows, replacement wall sections, posters, clocks, that selections up to you.



Using the same Point to Point selection process we can delete or cut various sections of the existing station building, in this case we have removed most of the offending items listed above, but we've also copied small sections of the wall especially around the windows and door in order to position them over gaps in the wall and over the offending shadows and notice board. The elongated section is from the edge of the roof line including most of the shadow line below it, this will be used to tidy up the shadow line especially at the notice board. For the most part this technique works due to cut and paste but also the extensive use of layers and the ability to promote one layer above or below another.





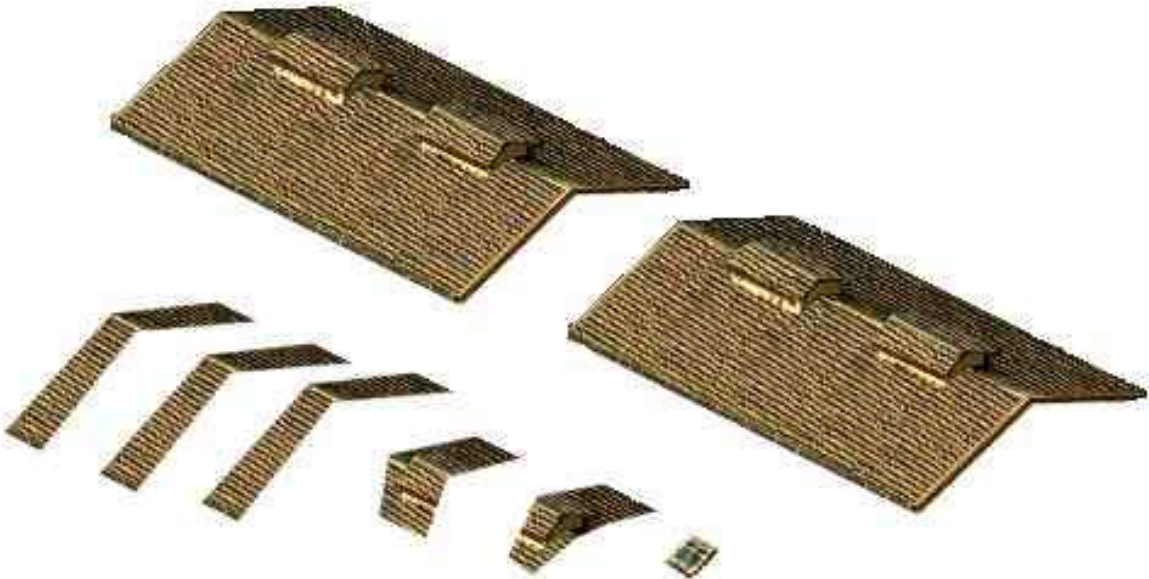
Using the same selection process I've copied the roof light in the station roof however it is pitched at the wrong angle for our new roof. The image was then subjected to the "Skew" Geometric effect, with a Horizontal value of 25. Once corrected they were reapplied to new roof once in place.



The wall, door and window elements have been put in place, the various visible layers were then merged and some minor use of a clone brush was made to remove any remaining objects and other artefacts in the wall.



It's necessary to go through the same process for the roof, remember it is often worthwhile to have several copies of any cut out part, each on it's own layer so it can be easily manipulated. Full width strips of the roof have been selected along with either end of the roof vents and the above roof light.



The roof is now in place and we're only missing the end wall.



As previously we've extracted the relevant sections of wall from an existing building. Each of the wall sections is on it's own layer and these are demoted to be below the existing building image. Crucially minor errors have crept in along the top of the gable end wall where a number of white or transparent pixels exist, this is the perfect time to use the zoom, paint and draw line commands remembering to colour sample the new wall and ideally using as small a brush size as possible. One thing to bear in mind is, if the wall sections you wish to use are too dark or light for their position relative to the direction of the sun , you can always copy the wall section as a new image and alter or mirror it to suit then change the light intensity and colour hues to give a more realistic look, alternatively you could apply a semi-transparent top layer to darken the image.

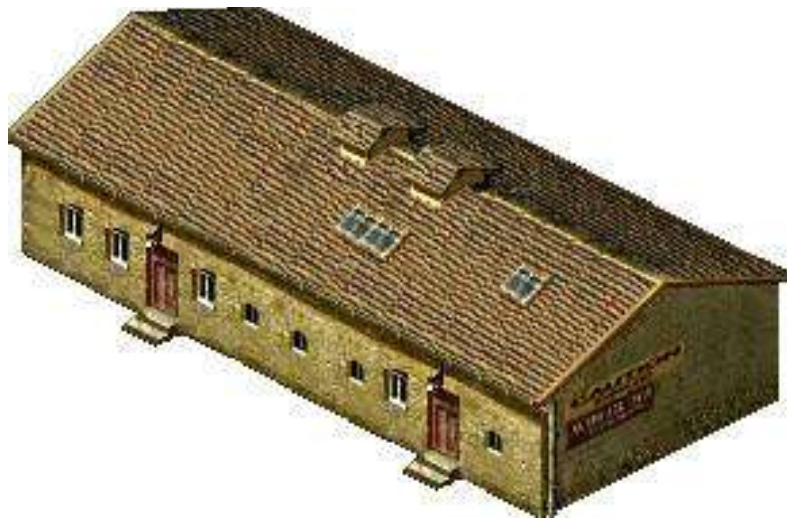


Almost complete, but there are some subtle faults, the roof overhang on the far left and right corners are not symmetrical. There are also white lines along edge of the roof at the gable wall and near corner, also the downpipe is not quite finished at ground level. Another error shows up only when the image is placed on a black background.



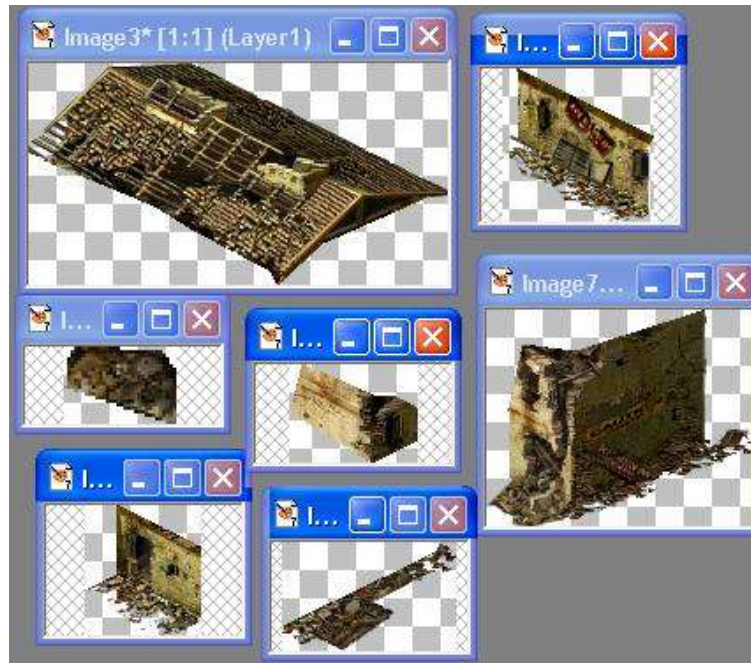
What we have is a light line running along the base of the wall, this was caused when using the selection and cut tools, leaving feathering and or anti-alias switched on. The line does not look significant but when placed on certain terrain surfaces will be distracting, make sure you keep your selection process sharp and precise. The best solution in most cases above is to zoom in and pixel paint the adjustments, you could even draw point to point lines of a suitable colour to overdraw the lighter ones. In the case of the differing corner profiles select, copy and paste or select and delete using a rectangular selection band.

The finished building (1.tga), or is it. If putting all those image splices together seemed long winded, then you won't like what's coming next. Remember each building also has a damaged and destroyed state, so 2 more graphics are required (2.tga and 3.tga).



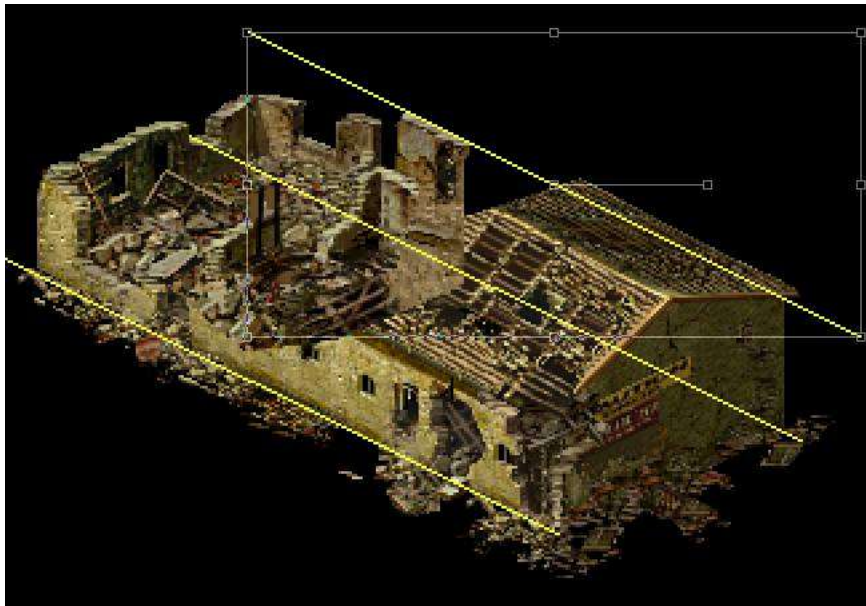
## Creating the damaged and destroyed state graphics

Okay so far so good now lets put together the damaged and destroyed building states. We need to use similar techniques to above ideally building our images over a copy of our new building in order to preserve the exact building size and position. Once again I've used a selection of damaged building parts which will be edited further.

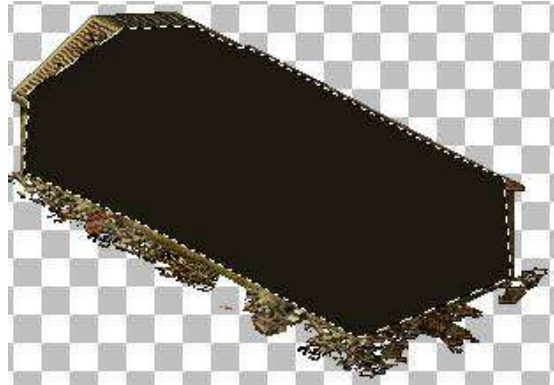
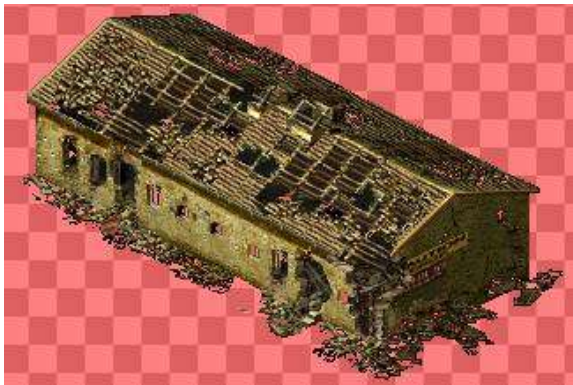


As before it's useful to copy and paste some of the parts into position as new layers over your initial graphic in order to better visualise your building. A useful aide in aligning your wall and roof sections, is to create a new layer specifically for producing a grid of vector lines. Create the first one along the base of an exposed wall then copy and move the new lines into position, just make sure that when you save the graphic image or merge any of the new layers to either switch off the visibility of the vector layer or delete it, you don't want a series of construction lines in your image.

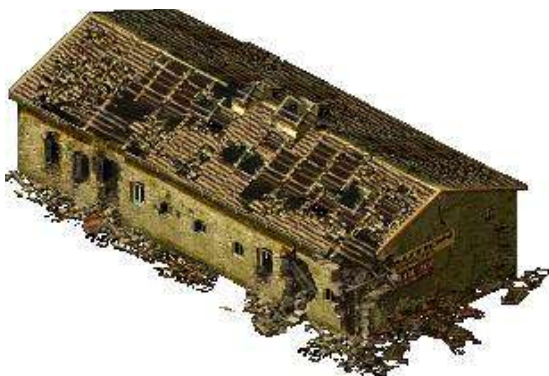




After copying existing damaged building elements and creating an Alpha channel from the images non zero value (i.e. all black RGB 0, 0, 0 pixels) you may find your new building has a number of unintentional white / transparent holes through it highlighted here in pink. These are caused by black pixels in the original images, some you may wish to keep (i.e. at door and window opening on the rear walls, but the rest you should remove. You could edit the mask or the image layer by painting out the individual pixels but there is a quicker way. Create a new raster layer, use the freehand selection tool and create an area encompassing all the missing pixels, select a suitable dark colour of any RGB value other than 0, 0, 0 and fill the selected area, now demote this layer, moving it down a level or more if required, now merge the visible layers and remake your Alpha layer and all should be well.

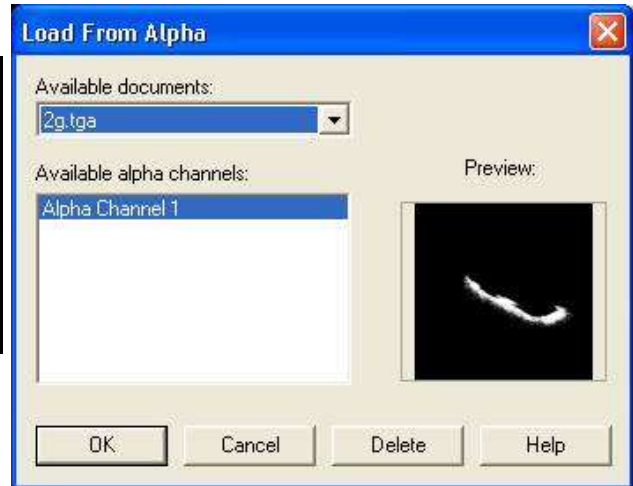


The final damaged and destroyed images below.



## Producing building ground textures

Open up one of the original 2g.tga files from the Resource files. I've selected the one from the Railway station since it almost matches the length of our new building but any texture will suffice because we can cut, splice and overlap them on as many layers as we want until it looks right.



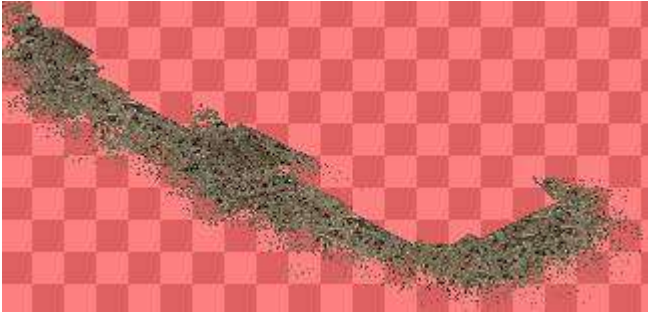
Use "Selection" then "Load from Alpha channel", the terrain should now be selected. Copy and paste this as a new image, we will use this as our source texture.



One thing you may have noticed is that the original texture is wider than that selected by the Alpha channel, this appears to be due to limitations, error or possible repair of holes in the texture during the original creation process. If you select the texture by any other means than the Alpha channel (i.e. magic wand) you will find black artefacts within the texture which may cause problems when creating your new Alpha mask, (holes in the texture). On the other hand you may wish some of the original ground texture to show through in different locations, after all debris will not spread out uniformly over a surface.



You can repair any texture holes caused by black pixels by the method described in the Damaged and Destroyed buildings section above.



To ensure you get the correct shape for your ground texture you should place a copy of your building or it's Alpha channel outline as a separate layer beneath your working textures. You can switch the buildings visibility on or off to check what you've done. Once the texture looks right switch off or delete the building layer and merge your visible texture layers. The completed texture for our building is below.

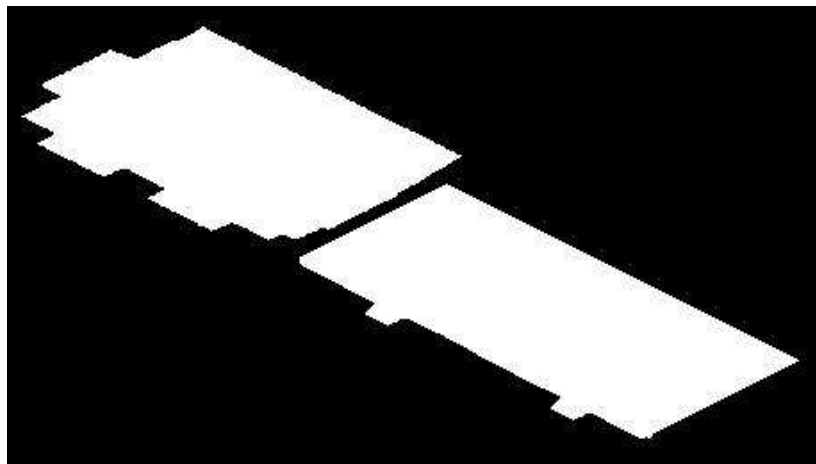




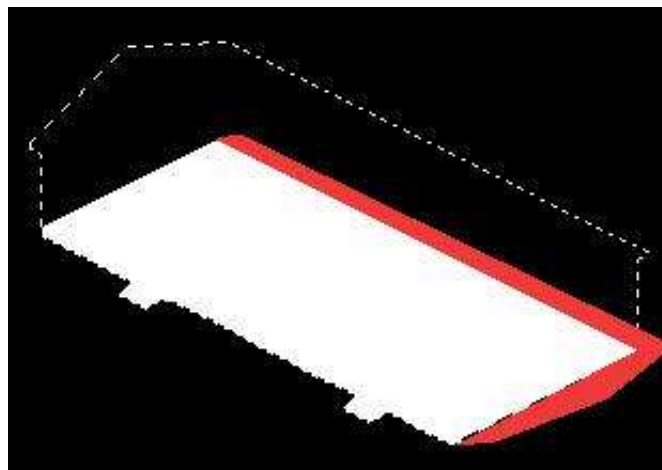
## Shadows in 2D

The creation of shadows or silhouettes can be done in the same way as the above cut and paste method, that way you should produce a reasonably accurate silhouette file, however there are other ways. You could just manually draw your shaded area purely by educated guesswork, you could even load your image into a CAD or 3D package and create 3D faces for your building and produce your shadow form that, you could even make skewed, mirrored and resized elements of your building to produce an approximate shadow using an alpha channel, but here I'll show you another option that can be done purely in 2D.

There are a number of factors to take into account, firstly your silhouette image includes the area of ground the building occupies as well as the shadow cast. The image below shows the base / ground silhouette of our new building and above is the silhouette from the original warehouse used earlier. It can be seen that the original silhouette image is deeper than our new one also the bottom right edge of the silhouette is not straight edged as ours is due to the shadow cast from the angle of the roof. The protrusions are different but these only correspond to doorways which we have already altered, any opening to the rear of the building can normally be discarded as they will not be seen anyway.



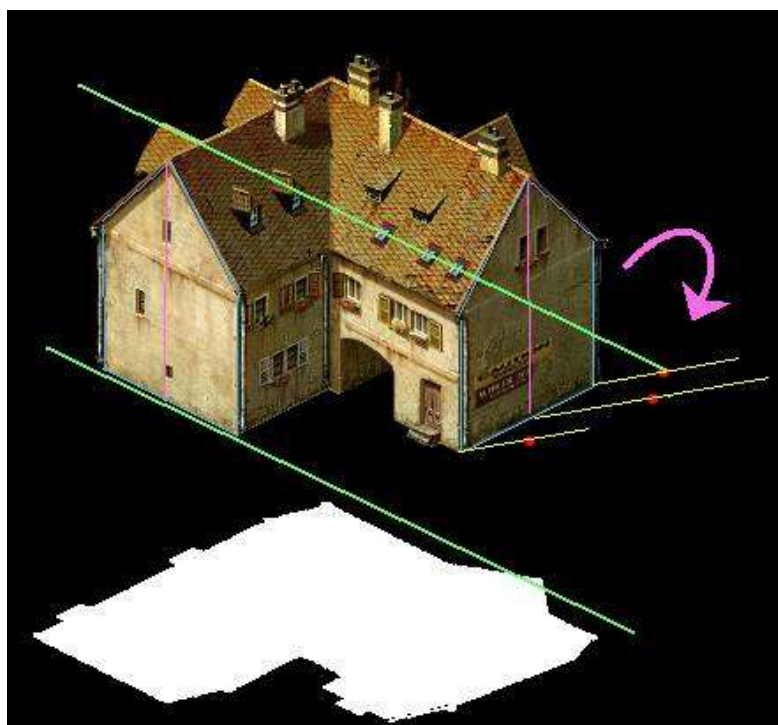
The area in red roughly highlights the shaded area required for our building (the dashed line is only to illustrate our buildings outline). To be honest we could easily produce this silhouette manually, joining up both the red and white areas, then making the combined area white.



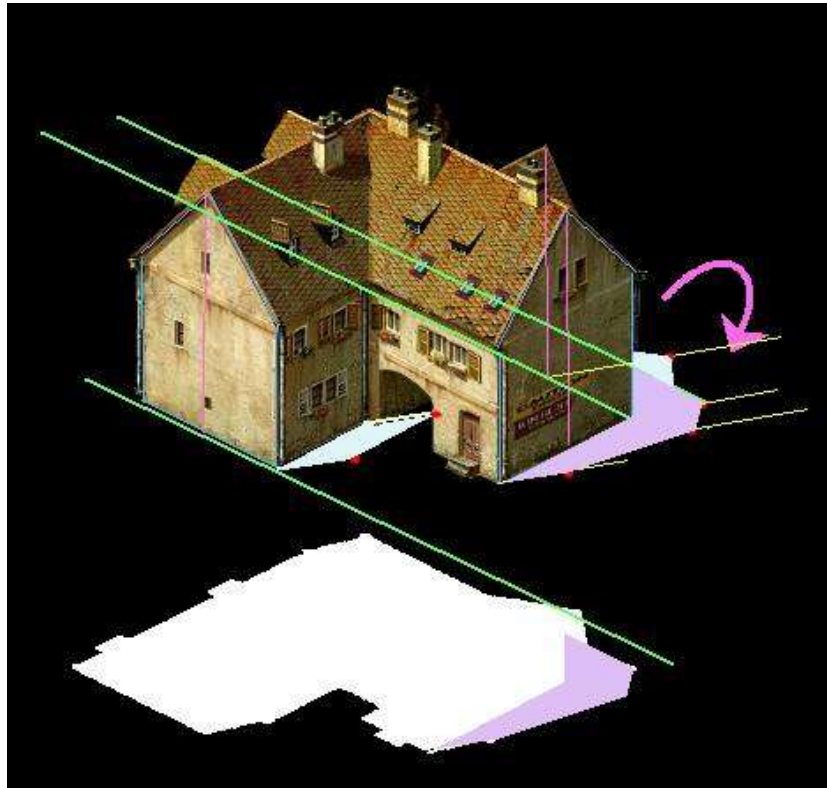
But what happens when our building is a bit more complicated in outline? Here we can see the earlier used TownHouse placed on top of it's silhouette image



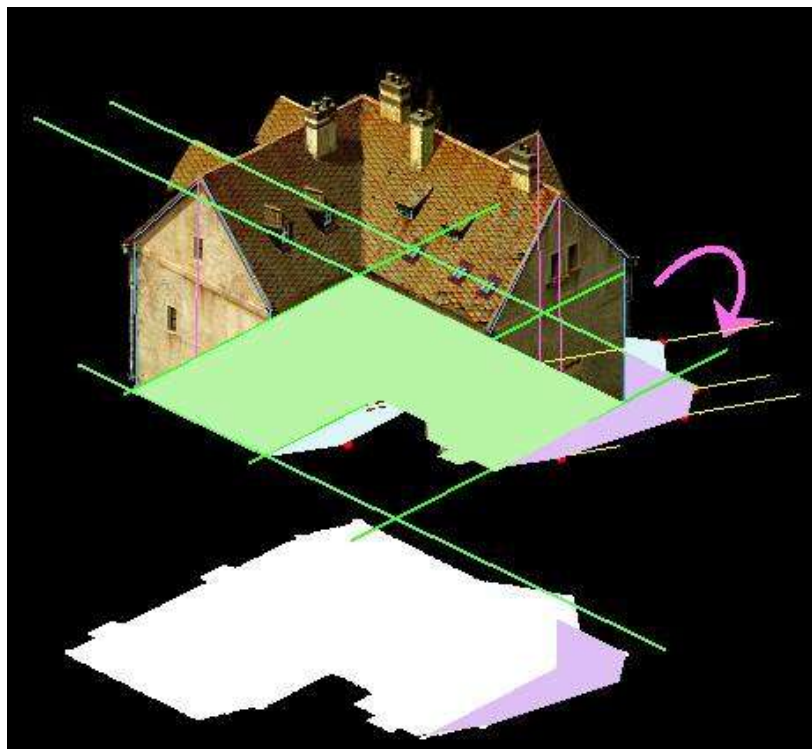
What we can do is work out a reasonably accurate out silhouette by using vector lines (ideally on differing layers) to act as a grid for our calculations. On the right of the building we have a group of 3 yellow lines, these are copies of the vertical blue and pink lines indicating the building heights at the gable wall. The lines are then rotated, ideally 77.5 degrees to the right and a point selected exactly half way along the line (i.e. The shadow length is half the actual height). The topmost green line indicates the edge of the roof corresponding to the rear wall, you should also bear in mind the slope of the roof which in this case will allow the passage of sunlight with the exception of the rear dormer window and possibly the tops of the chimneys. The lower silhouette image is the official rendered Blitzkrieg one.



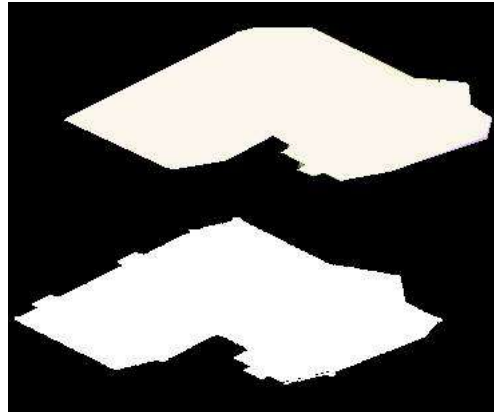
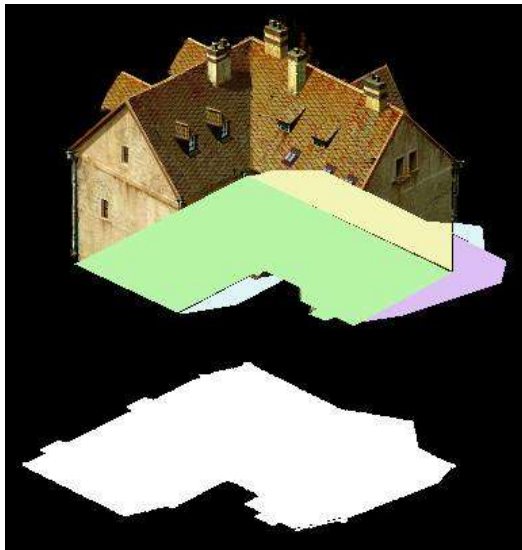
Now it's just a matter of using a point to point selection process, joining up the dots (takes you back to your childhood doesn't it) and filling the selected area. Below the lilac area has been overlaid on the original silhouette for comparison, the more accurately you do this process the more realistic the final silhouette.



Producing a grid (the green lines) to indicate the outline of the buildings base area, you could also produce the front outline part of this by utilising an alpha channel mask.



Finishing off the same process and removing all our construction lines, the coloured areas are our new silhouette outlines. Comparing our new one (top image) to the original (lower image) there are minor differences due to the missing doorsteps to the rear of the building and our new silhouette has not taken into consideration gutters, downpipes and similar small protrusions.



Just to prove the same process can be used for even more complicated silhouettes such as the WatchTower, the lilac images on the right were created using the process above, the white ones are the original rendered ones. Not a bad likeness though it could still be improved with a bit more accuracy and perhaps the use of a blur or unsharpen effect, make the alpha channel mask and reuse it to produce the actual image, finally deleting the lilac layers. The tower legs were produced by our half length rotated lines being left in place and some additional lines drawn in for the cross bracing.

