# CS5245:

# VISION & GRAPHICS FOR SPECIAL EFFECTS

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## PROGRESS REPORT UPDATE 2


BY

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# I. CHANGES AND UPDATES OF PROJECT PLAN

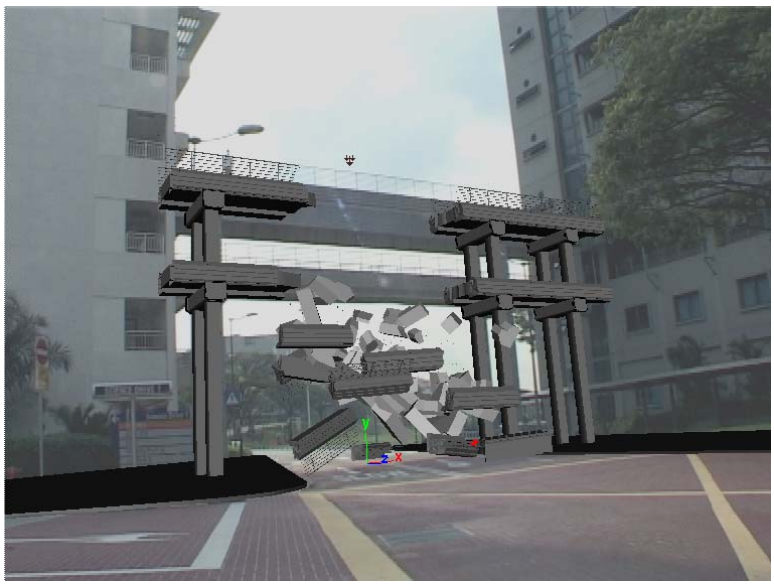
## FLUID-LIKE CREATURE

We initially thought of detailing the creature with nice surface details and textures but we gathered that it might have been seen in movies too often and might not be creative enough. We are now doing some tests to create a fluid-like creature. Results of these initial tests look very promising and we will continue to head towards this direction for the creature.

# II. WHAT HAS BEEN DONE SO FAR (WEEK 11)

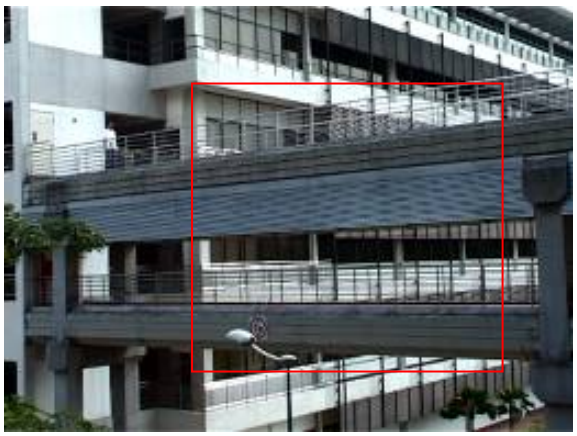
## BRIDGE/RAILING DESTRUCTION SIMULATION

The breaking up of the bridge into smaller blocks has been done. It is simulated in Autodesk Maya using a third-party plugin. The collapsing portion of the bridge is pre-fractured using the plugin and a few explosives are placed in strategic locations to direct the blasting sequence. The explosives are set to explode at staggered timings to give the shot a more dramatic look. After the explosives go off, some of the affected fragments will detach themselves from the bridge and the rigid body dynamics will take over. Overall, the simulated animation looks realistic and natural. A screenshot of the result is shown below.



## BRIDGE REMOVAL

Our initial plan was to try to research and apply image-based algorithms to remove the middle section of the S15-SoC1 bridge, which will be demolished (see red box region in images below). The resulting sequences with the bridge deleted will become our "clean-plate" footage to composite the CG bridge and other graphics elements for the final effect.



There are several sequences in which the bridge has to be removed, ranging from straightforward scenes to scenes with complex background patterns (such as buildings).

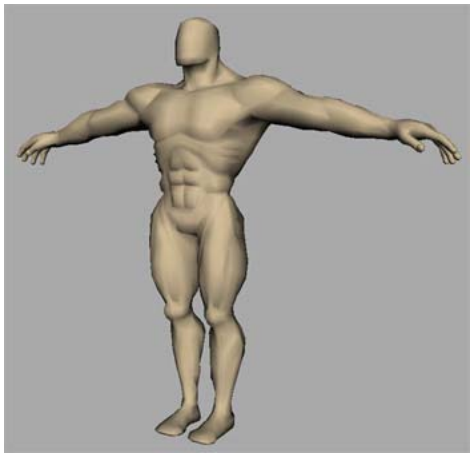
For the simple scene (with the bridge against the sky), our plan was to use image in-painting algorithms to fill in the deleted bridge portion. However, the algorithm did not work to our satisfaction, yielding poor results such as the following image, which the algorithm attempted to reconstruct the bridge instead of removing the middle portion.

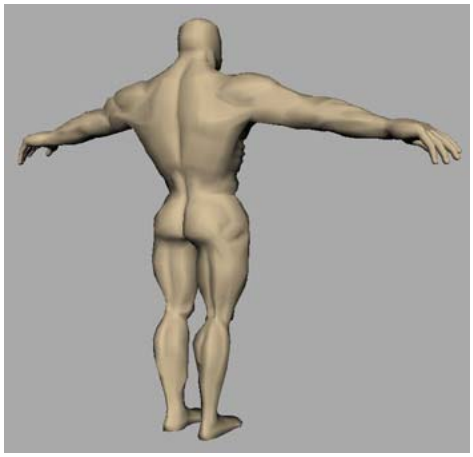
As a result, we decided to simply use Photoshop to paint over the bridge.

In scenes with complex background details, we also made use of Photoshop to reconstruct the background with the bridge removed from elements in the existing image, as well as using images taken from other angles where object details can be seen. Here are some examples of work-in-progress images. Notice how the bridge has been partially removed.

## CREATURE MODELING

Due to copyright issues, we decided right from the start that we should model out the entire creature on our own. We followed the anatomy of the human to give the muscular creature nice definition and form. The model is created such that it can deform properly when skinned.





## CREATURE RIGGING AND SKINNING

The character rig has been done. Joints have been placed into the creature and intuitive animation controls have been created for ease of animation. The character's mesh has been skinned to the joints and poor deformation regions have been corrected. Basically, the creature can now be animated intuitively and the deformation looks decent.

## CREATURE ANIMATION

Using the CG environment which has been matched with the live footage, we have inserted the creature into the scene and done the animation for a couple of shots, based on the animation done in the pre-visualisation. We have not proceeded on with any further animation because we have changed the creature to a fluid-like creature. The way a fluid-like creature moves is slightly different from a normal creature and thus we have to confirm the final behaviour of the creature before we can continue with the animation.

# III. DIFFICULTIES FACED AND THEIR WORKAROUNDS

## BRIDGE SIMULATION

One of the main problems faced is that the different simulations systems do not have direct interaction with each other. Maya's rigid body system does not interact with the plugin's rigid body system. In order to solve this problem, we had to create some additional setup (e.g. parent constraints) to allow for interaction between the two systems.

## RAILING DEFORMATION

The railing deformation animation was hard to simulate as well because we need to make it break and bend in a natural-looking way. We tried out many deformation simulations using Maya's cloth and hair system as the fundamental solver. However after much experimentation, simulation proved to be unstable and there is not much control over the animation. In the end, we decided to use lattice deformers which are skinned to joint chains. We then animated the joint chains to deform the lattice, which in turn deformed the railings to the state that we wanted. Below is a test deformation that we have done.