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Author(s)	Pan, J. L.
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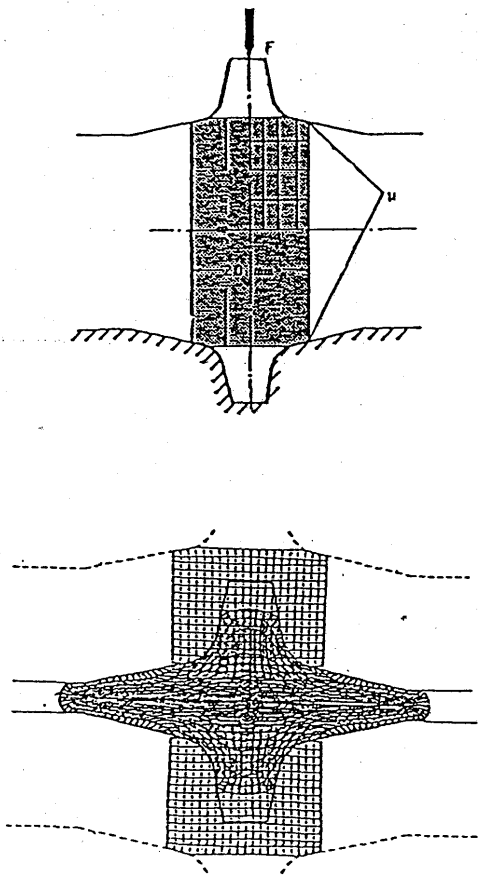


Figure 5 Dye Forging Analysis

typical approach of finite element method is being changed from implicit to explicit, from Lagrangian to ALE because of the following two reasons; 1) physical natures of the methods allow more complicated and more realistic problems to be solved, 2) the methods are more suitable to multitasking as well as vector processing to reduce computational time. Future supercomputers will be smaller but more memory, more number of CPUs and more single CPU vector and scalar power will be equipped along efficient and stable cooling technology.

#### References

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## “Future Direction of Welding Structure Production”

Prof. J.L. Pan

### Comment (S. Fukuda) :

As the products are getting more and more diversified and new welding technologies are emerging up, it becomes often necessary to introduce a new way of thinking.

In the former times, manufacturing was made in accordance with the requirements of design. But today we have new welding technologies such as laser or robotics. In applying these new techniques, it would be much easier if we change our design of machines and structures to suit to these new techniques rather than to apply new techniques to the conventional designs. Thus, it seems to me that we should not consider manufacturing alone but we should consider manufacturing and design interactively at the same time. I should be very happy if I could have your opinion on this point.

### Answer (Prof. J.L. Pan)

- 1) Generally speaking, design should be reasonable so that manufacturing is possible. The manufacturing technique should be good enough to meet the requirements of design. Sometimes when a new manufacturing technique is found, it may tremendously change the relationship between design and manufacturing. For example, if E or laser is to be used for welding of thick wall pressure vessels, it will change the design and ease the manufacturing.
- 2) Concretely if talk about arc welding robot application, would like to say that the main direction is to improve the manufacturing technology. Because the design could not change the picture of uncertainty of manufacturing conditions. For example, inaccurate groove preparation and assembly of weldment made on site in open air. That is the reason why I emphasize the intelligent control of welding process and expert system for welding engineering.

### Concluding Remarks

Prof. S. Fukuda and Prof. H. Murakawa

Up to now, computers have been utilized to process numbers. But symbolic processing is becoming easier and easier with the rapid improvement of computer environment. What should be emphasized is that numerical processing is of course very important but we should also pay more attention to the utilization of symbolic processing. Or such example is the image processing Dr. Thorpe me