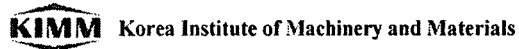
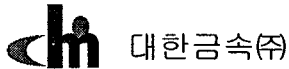


## 유한요소해석을 이용한 다단 포머 성형 공정 연구

\*왕한섭, \*최종원, \*\*이정환

\* (주)대한금속

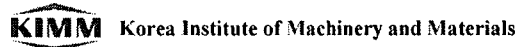
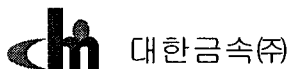
\*\* 한국기계연구원 공정연구부



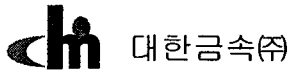
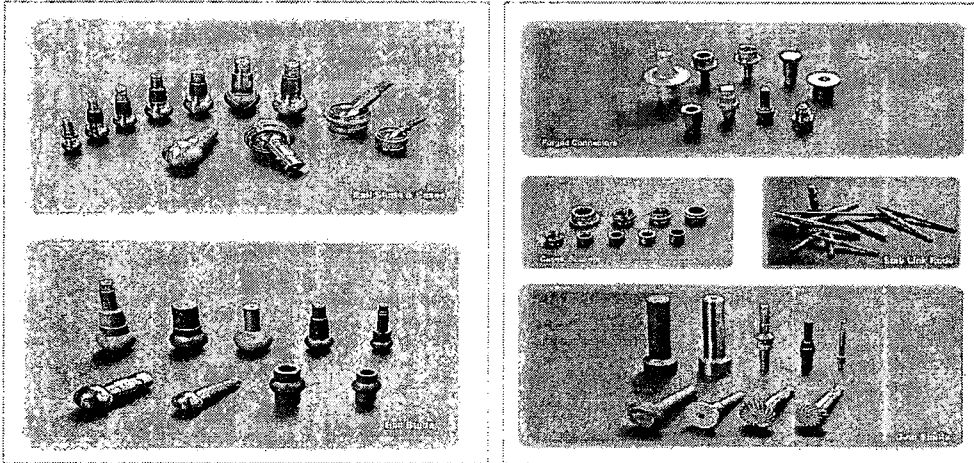
### 대한금속(주) 현황

1. 상 호 : 대한금속주식회사
2. 소재지 : 경북 경산시 진량읍 신상리 1206-15
3. 설립일 : 1978년 10월 10일
4. 종업원수 : 56명
5. 대지면적 : 1,500평
6. 건물면적 : 1,077평
7. 연혁 :

1978.10.10.	대한금속 설립	2000.03.19	CBF 255L M/C 중설
1985.06.17.	노원공단으로 회사 이전	2000.05.19	CNF 208M M/C 중설
1987.10.08.	제 2 공장 설립 (관지몰트 전문회사)	2000.09.17	CBF 134L M/C 중설
1988.09.30.	유한중소기업 선정(국민은행)	2001.01.20.	CBF 165S(M) M/C 중설
1989.10.27.	조향장치용 BALL STUD 개발	2001.03.09.	QS 9000 인증취득
1990.07.15.	POWER STEERING OIL PUMP 용 CONNECTOR, SHAFT 개발	2001.05.20.	CBF 105L M/C 중설
1995.05.10.	진량공단으로 회사 이전	2001.06.12.	HMC, KIA 'SQ' 인증취득
1997.04.01.	대한금속(주) 법인전환	2001.11.16.	CBF 205L M/C 중설
1998.02.06.	별조인트 제조방법및장치에 대한특허 취득	2001.12.06.	벤처 기업으로 선정
1998.08.29.	ISO 9001 인증취득	2002.09.07.	CNP 276S M/C 중설

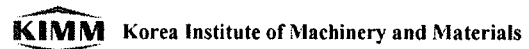
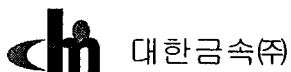


## 대한금속(주) 생산품

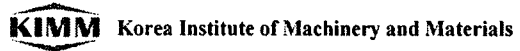
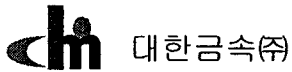
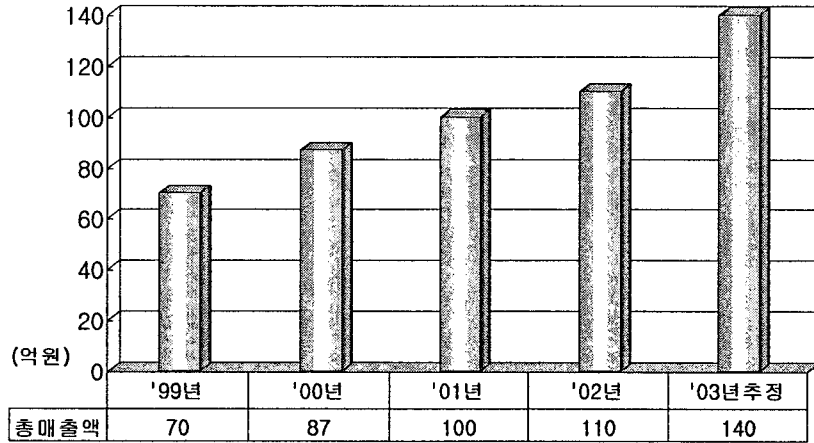


## 대한금속(주) 설비

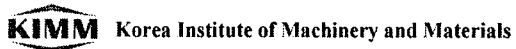
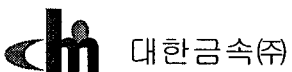
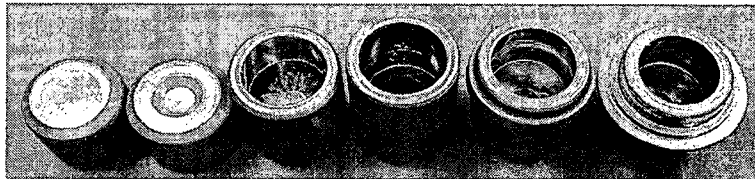
NO	설비명	규격	보유수량	구입년도
1	BOLT FORMING 기	8-36 m/m	16	1990-2002
2	HEADING 기	6-22 m/m	4	1988-1992
3	ROLLING 기	6-16 m/m	10	1988-1994
4	WASHER 조립기	6-8 m/m	3	1992
5	연마기	16 자	1	1992
6	선반	5-6 자	2	1990-1994
7	세척기	7 m	1	1995
8	밀링기	6 호	1	1994
9	열처리로	400-450 m/m	1	1991



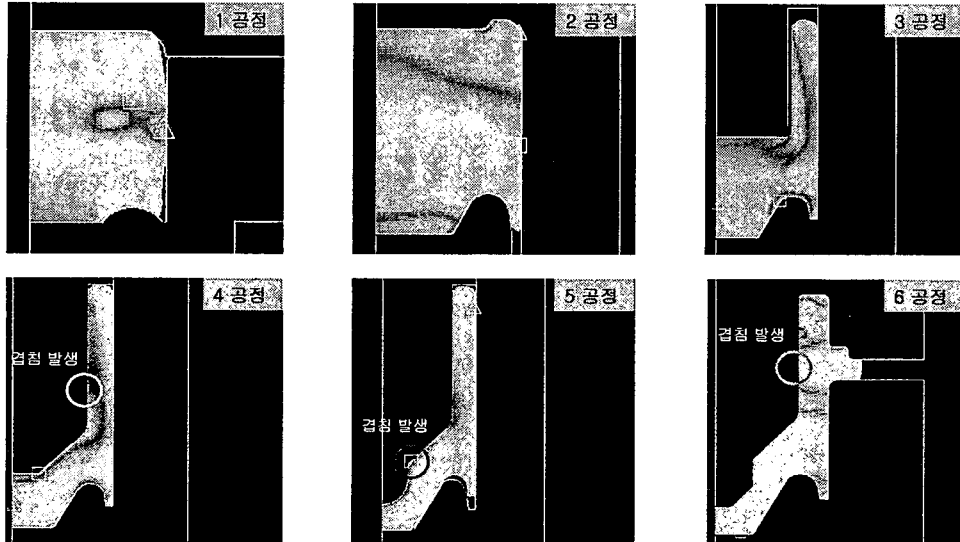
## 대한금속(주) 매출



## Side 부품 제조 공정 최적화를 통한 결함 발생 제거



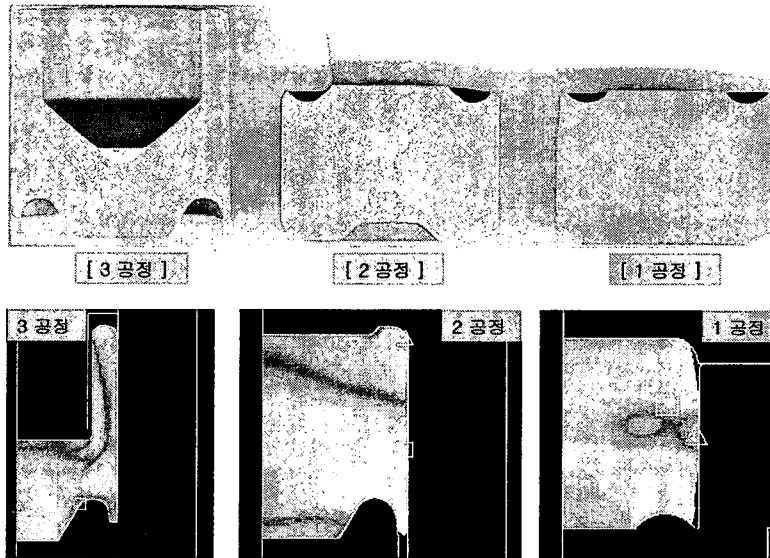
### Side 부품 단조 공정 해석 결과 (Case - 1)



**ch** 대한금속(주)

**KIMM** Korea Institute of Machinery and Materials

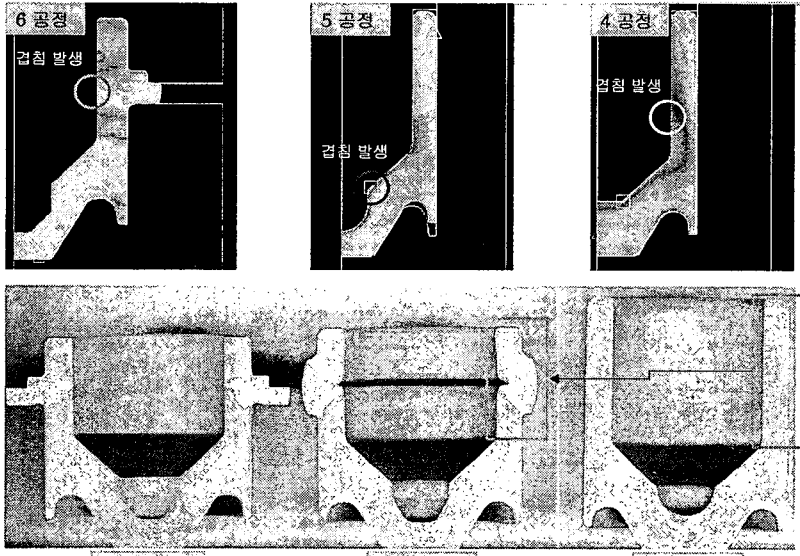
### Side 부품 단조 공정 해석 결과 (Case - 1)



**ch** 대한금속(주)

**KIMM** Korea Institute of Machinery and Materials

### Side 부품 단조 공정 해석 결과 (Case - 1)

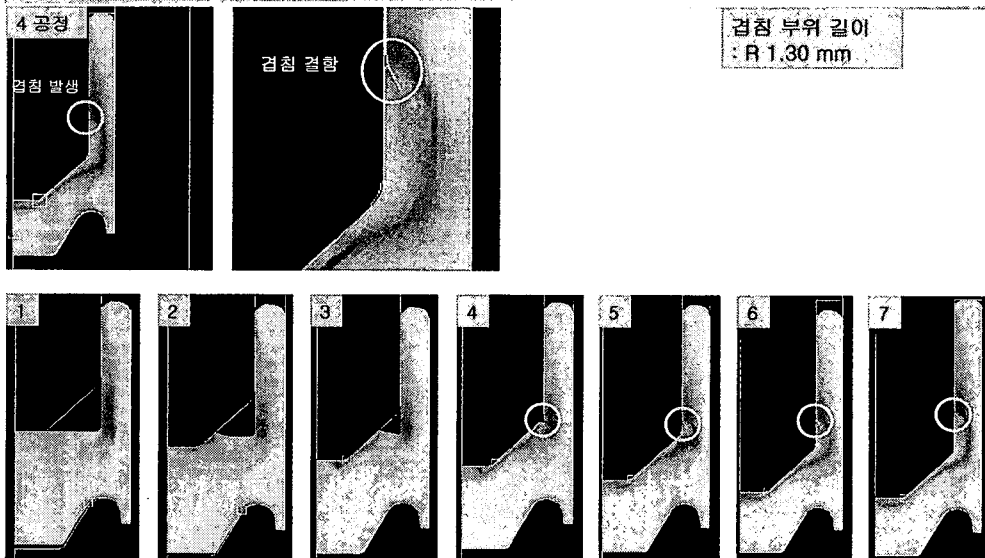


깊이가 감소하는 방향으로 Upsetting이 되기 때문에 결함 제거 불가능

**dm** 대한금속(주)

**KIMM** Korea Institute of Machinery and Materials

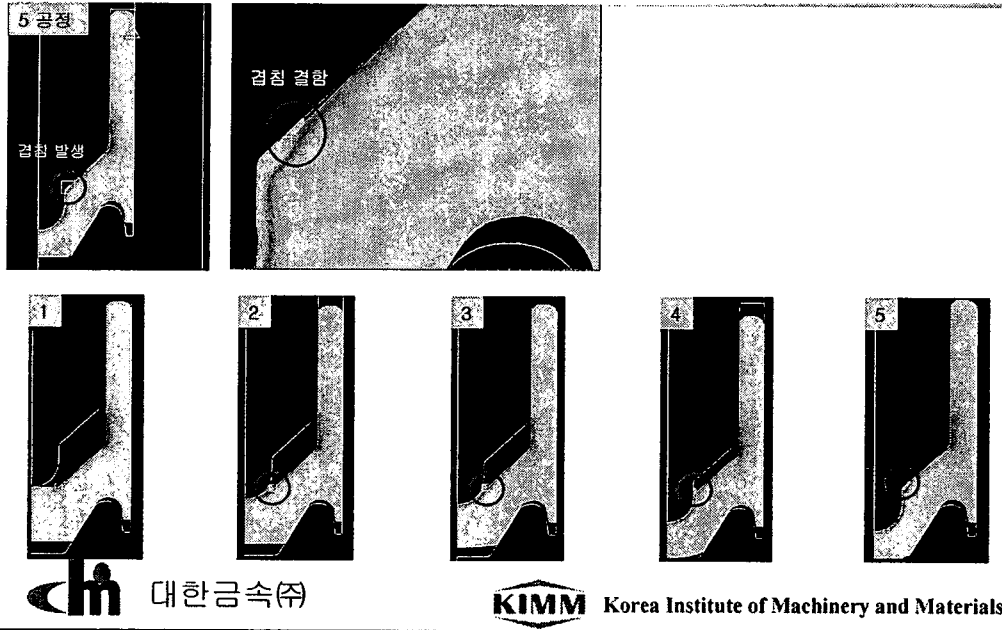
### Side 부품 단조 공정 해석 결과 (Case - 1)



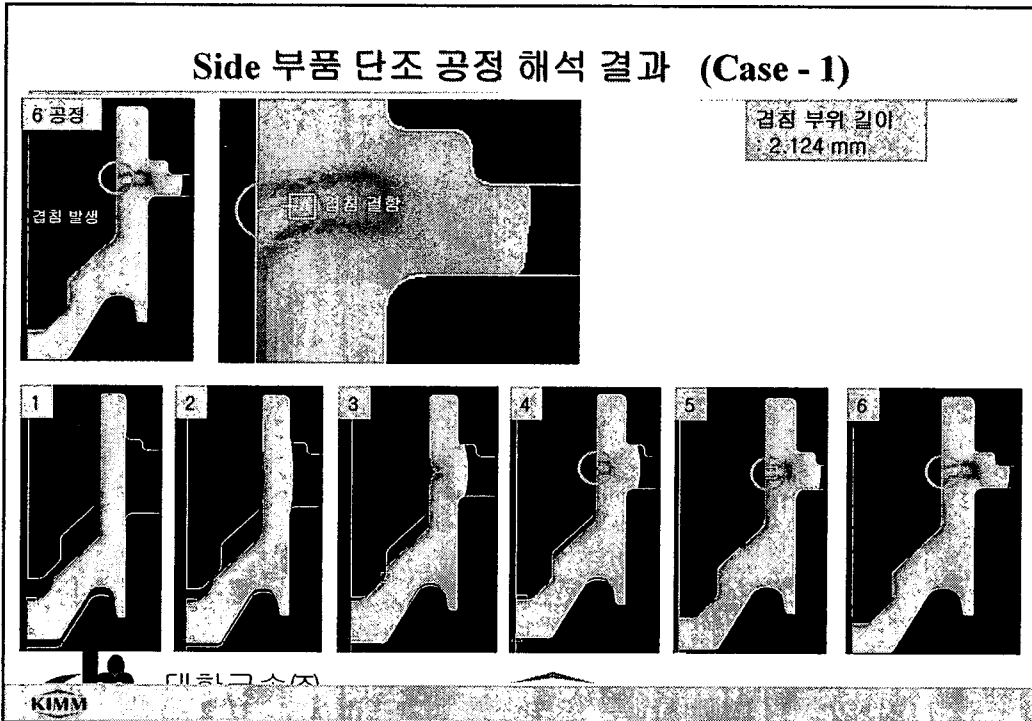
**dm** 대한금속(주)

**KIMM** Korea Institute of Machinery and Materials

### Side 부품 단조 공정 해석 결과 (Case - 1)



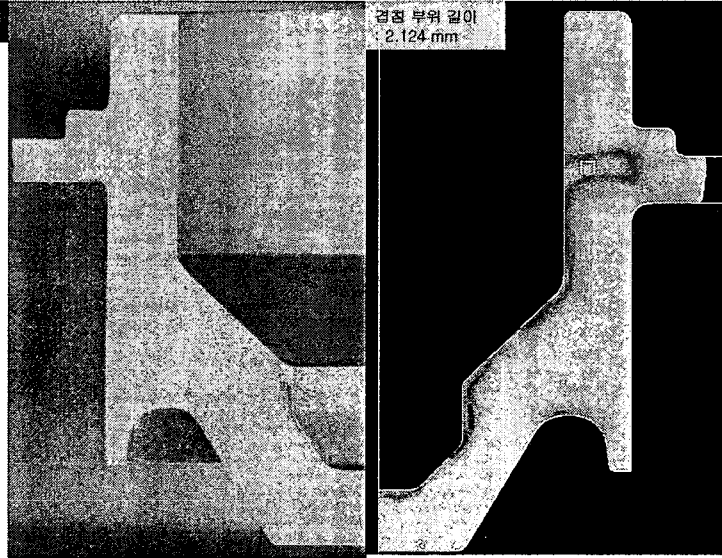
### Side 부품 단조 공정 해석 결과 (Case - 1)



## Side 부품 단조 공정 해석 결과와 시제품 비교(Case - 1)

6 공정

검정 부위 길이  
2.124 mm

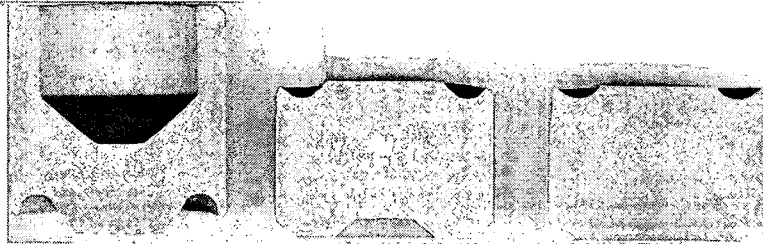


대한금속주



Korea Institute of Machinery and Materials

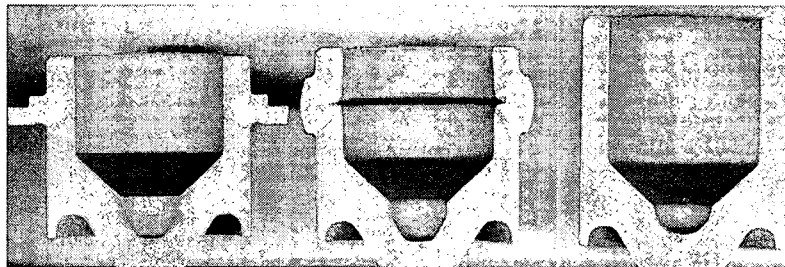
## Side 부품 단조 공정 해석 결과와 시제품 비교 (Case - 1)



[3공정]

[2공정]

[1공정]



[6공정]  
대한금속주

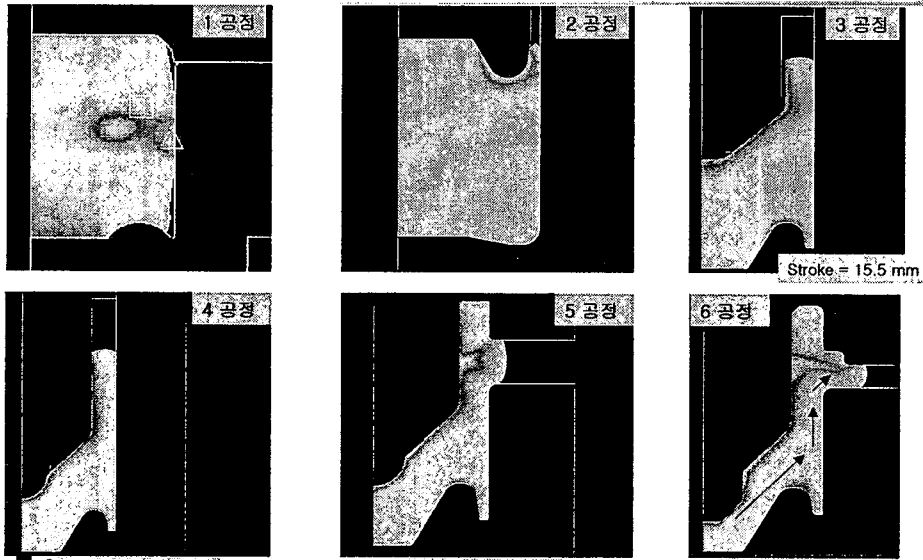
[5공정]

[4공정]



Korea Institute of Machinery and Materials

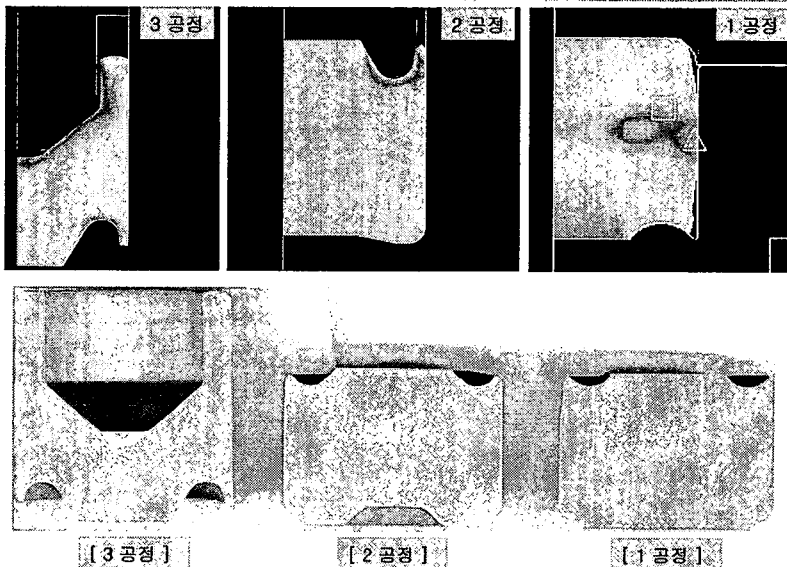
### Side 부품 단조 공정 최적화 설계 (Case - 2)



대한금속(주)

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### Side 부품 단조 공정 최적화 설계 (Case - 2)

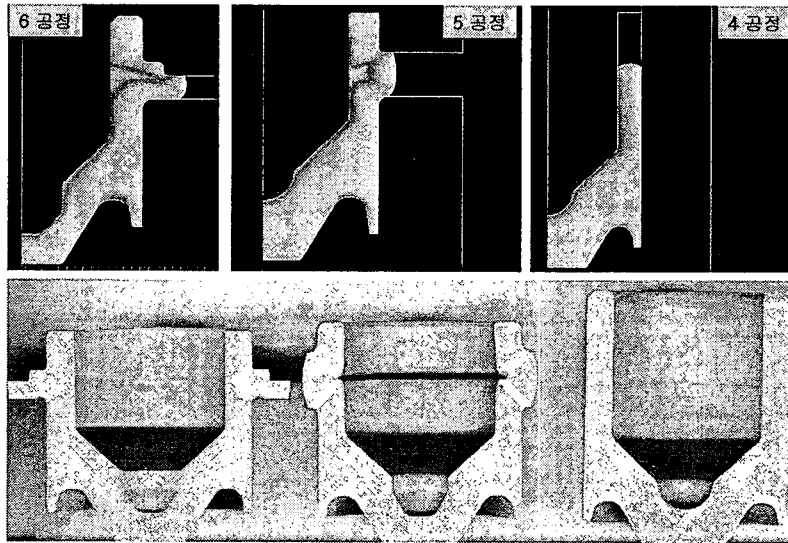


대한금속(주)

KIMM Korea Institute of Machinery and Materials



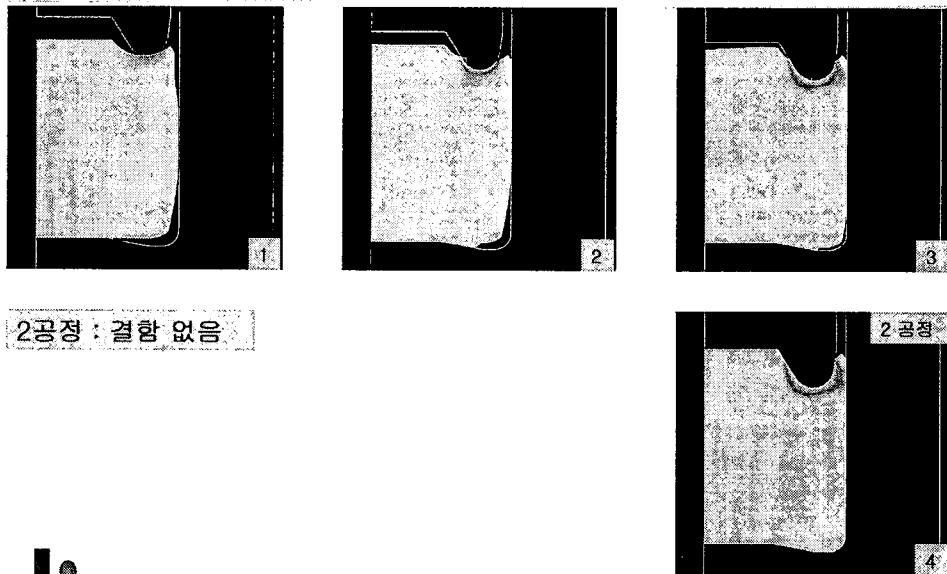
### Side 부품 단조 공정 최적화 설계 (Case - 2)



**ch** 대한금속주

**KIMM** Korea Institute of Machinery and Materials

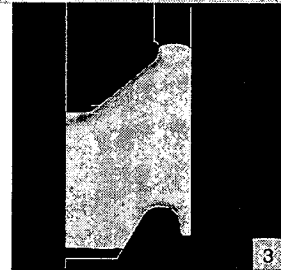
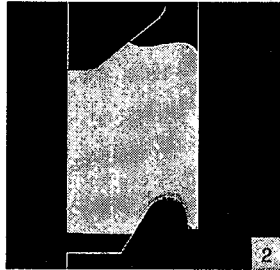
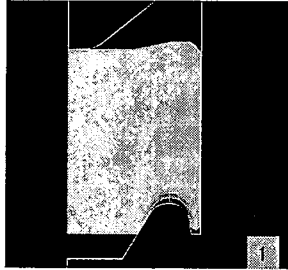
### Side 부품 단조 공정 최적화 설계 (Case - 2)



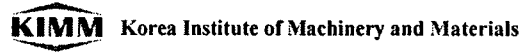
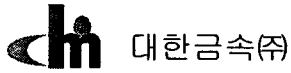
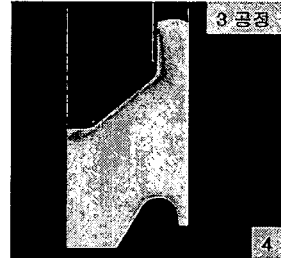
**ch** 대한금속주

**KIMM** Korea Institute of Machinery and Materials

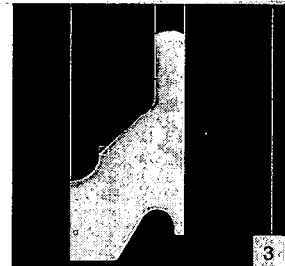
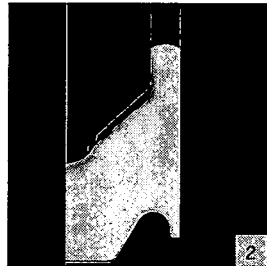
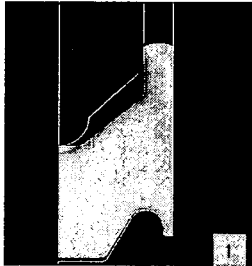
### Side 부품 단조 공정 최적화 설계 (Case - 2)



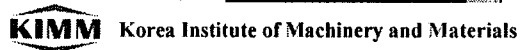
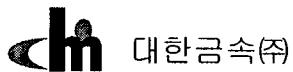
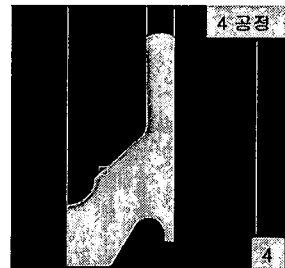
3공정 : 결함 없음



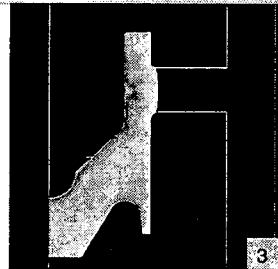
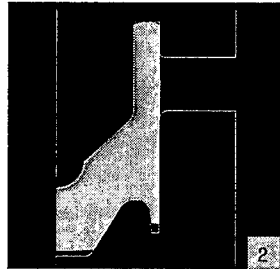
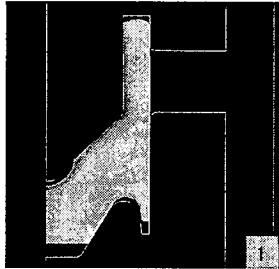
### Side 부품 단조 공정 최적화 설계 (Case - 2)



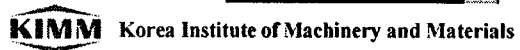
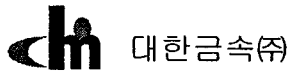
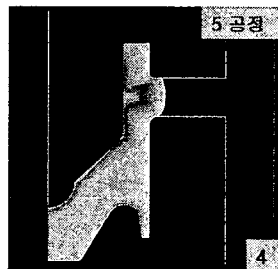
4공정 : 결함 없음



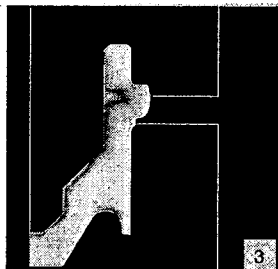
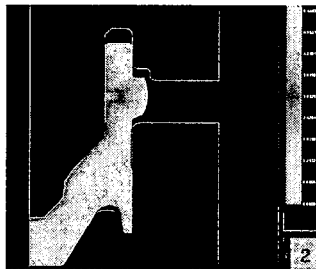
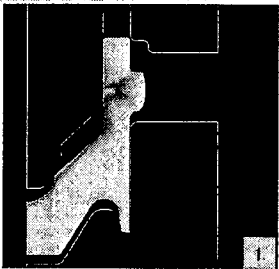
### Side 부품 단조 공정 최적화 설계 (Case - 2)



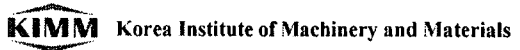
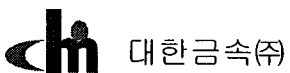
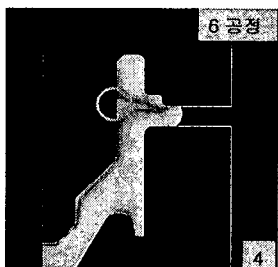
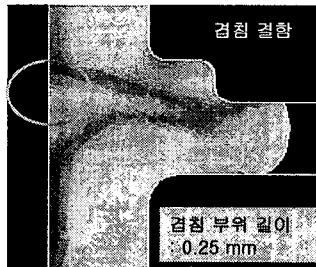
5공정 : 결함 없음



### Side 부품 단조 공정 최적화 설계 (Case - 2)



6공정 : 겹침 결함  
(깊이 : 0.25mm)



## 결론

기존 Press 공정 → 고속 다단 냉간 단조 공정

- 공정의 단순화 : 생산비 절감
  - 구상화 소둔, 쇼트, 윤활 : 3개 공정 제거 가능
- 생산 속도의 증가
  - 기존 Press성형품 : ~1개/분
  - 고속 다단 냉간 단조 : 46~50개/분